

Attractiveness and self-esteem: A test of sociometer theory

by

Chris Bale

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ABSTRACT

Sociometer theory (Leary & Baumeister, 2000) proposes that self-esteem is an evolutionary adaptation which functions to monitor the quality and quantity of people's interpersonal relationships together with their eligibility for these, and to motivate adaptive behaviour in response to these assessments. The present work describes a series of studies designed to systematically test hypotheses concerning relationships between self-perceptions of physical attractiveness, self-esteem and relationship behaviour, derived from sociometer theory. Study 1 extended previous research by employing a novel measure of self-perceived attractiveness and showing that this significantly and positively correlated with both global and multidimensional measures of self-esteem in both women and men. Studies 2 and 3 tested the hypothesis, derived from sociometer theory, that using a social comparison manipulation of self-perceived physical attractiveness should causally affect self-esteem in women. The results of these studies did not support this hypothesis and challenged previous findings in the literature: Women exposed to images of highly attractive others did not report significantly lower subsequent levels of self-esteem than those exposed to unattractive others. Study 4 examined whether exposing women to an implicit manipulation of self-esteem would affect their subsequent self-perceptions of attractiveness. The results showed that women exposed to a negative priming condition reported significantly lower levels of self-esteem and self-perceived physical attractiveness than those in the positive condition. These results constitute the first empirical demonstration that implicit manipulations of self-esteem can exert causal effects on specific self-perceptions. Study 5 examined the previously untested prediction that self-perceptions of desirability and self-esteem would correlate with self reports of romantic relational behaviour in

women. The results indicated that although self-perceptions of desirability significantly correlated with relational behaviour, self-esteem did not. These results, together with previous research in self-esteem are discussed in relation to sociometer theory, and a novel modification of the theory is proposed.

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CHAPTER 1

GENERAL INTRODUCTION

1.1 Approaches to Self-Esteem

Self-esteem is one of the most widely studied constructs in social and personality psychology and has been of interest to the discipline from its very conception. Nevertheless, significant controversy over the essential nature and function of self-esteem still exists, with a number of competing perspectives vying for dominance. In particular, most approaches have differed in the extent to which they adopt either an interpersonal (or social) or intrapersonal perspective.

Strongly intrapersonal approaches have tended to stress the importance of self-directed attributions of competence to self-esteem. For example, in the first distinctly psychological discussion of self-esteem, William James (1890/1950) suggested that it reflects the extent to which an individual's achievements live up to his or her aspirations. Similarly, later psychoanalytic approaches tended to focus on the discrepancies between people's actual and *ideal* or potential selves (e.g. Horney, 1937/1999) or on the level of consistency between their self-concept and their actual behaviour (Rogers 1951/2003). More recently, Kernis (2003) has suggested that self-esteem may result from behaving *authentically*, in a way which is congruent with one's "true" or "core" self. Contemporary intrapersonal perspectives have also emphasised the goal-directed aspect of self-esteem originally suggested by James (1890/1950). For example *Self-Determination Theory* (Deci & Ryan, 2000) suggests that high self-esteem results from satisfying basic human needs for autonomy and

competence, i.e. the ability to successfully manipulate one's environment in desirable ways.

However, such approaches ignore the fact that human beings are inherently social animals. Recently a number of theorists, drawing on insights from evolutionary biology, have suggested that many aspects of the human mind may have evolved as a result of competition between individuals within social groups for status, resources and mates (e.g., Miller, 2000; Pinker, 1997). Accordingly, Alexander (1980) argued that human self-awareness evolved as a means for individuals to compare themselves to others with whom they are competing for access to mates. It follows from this perspective that in order to fully understand self-esteem, the interpersonal or social influences acting upon it must be explored, and this has been the basis for a number of approaches to the topic.

The genesis of these approaches can be found in the work of Cooley (1902/1983) who posited the notion of the *looking glass self*. Cooley suggested that individuals' self-perceptions were based on other people's reactions to them, and that the self was thus reflected in the behaviour of others. This notion of "reflected appraisals" is a key component of subsequent interpersonal approaches to self-esteem. Mead (1934/1967) extended this work to include the role of social comparison. Specifically, he argued that people strive not for self-enhancement per se, but for superiority over others. Similarly, Maslow (1937), who argued that self-esteem was a basic human need and a precondition for *self-actualisation*, believed that it was related to "dominance feeling" or a sense of mastery or superiority over others. This view was reiterated by Barkow (1989) who suggested that dominance and social status may be especially important

factors in the evolutionary fitness of individual humans, who should thus be especially concerned with their performance in these domains.

One of the most influential current models of self-esteem, *sociometer* theory (Leary & Baumeister, 2000), continues this vein of interpersonal approaches, suggesting that a consideration of social relationships is crucial to the understanding of this construct.

1.2 Sociometer Theory

Despite the fact that self-esteem has been a primary area of study for more than one hundred years, it is only recently that any functional theories of the construct have been proposed. Leary (2003) suggested that many researchers have tended to focus on two areas: (1) the relationship between self-esteem and other personality or physical characteristics, and (2) how people strive to maintain and enhance their self-esteem. However, few have addressed the issue of the function of self-esteem, or what it is actually *for*. Thus, much research has tended to assume that high self-esteem is necessarily desirable without addressing why this is so.

In response to this theoretical gap in the literature, Leary, Tambor, Terdal and Downs (1995) developed a theoretical model of self-esteem which posits that it acts as an *interpersonal monitor*. The central proposition of this theory is that self-esteem acts as an internal monitor of the extent to which an individual is valued or devalued by others as a relational partner. It thus monitors one's eligibility for lasting, desirable social relationships. This sociometer is also concerned with motivating people to maintain a minimum level of acceptance from others.

Sociometer theory represents a development of earlier interpersonal approaches discussed above, in terms of positing that self-esteem is heavily dependent on individuals' reflected appraisals. However, sociometer theory goes further in suggesting that self-esteem does not simply reflect the appraisals of others, but acts as a gauge which functions to monitor and maintain the quality of interpersonal relationships. This functional analysis stems from the observation that humans have a fundamental need for social attachments (Baumeister & Leary, 1995). From an evolutionary standpoint, it is likely that individuals who manage to form extensive social bonds will produce more offspring than their solitary counterparts (Leary & Baumeister, 2000). These differences in reproductive success are the driving force of evolution, such that individuals who are better adapted to their physical and social environments tend to leave more offspring (Dawkins, 1976). Group living confers a number of benefits such as mutual protection, cooperation in the acquisition of food and other resources and a more efficient division of labour, all of which are likely to enhance the reproductive success of individual group members (Barrett, Dunbar & Lycett, 2002). Therefore it is likely that natural selection has led to a fundamental human motivation to form and maintain at least a small number of close social relationships (Leary & Baumeister, 2000).

Leary and Baumeister (2000) present evidence from a multitude of studies supporting their sociometer theory. For example, self-esteem has been shown to respond to a number of social inclusion/exclusion outcomes, with laboratory studies finding that participants who are led to believe that they have been rejected by others experience a drop in self-esteem (Kavanagh, Robins & Ellis, 2010; Leary, Haupt, Strausser & Chokel, 1998). Denissen, Penke, Schmitt and van Aken (2008) provided further support for sociometer theory by showing that

people who report having higher quality interpersonal relationships also report higher levels of self-esteem, and that aggregate levels of self-esteem in citizens of different countries are positively correlated with the degree of close social interaction characteristic of individuals within those societies. Furthermore, Back et al. (2009) showed that people's scores on a variety of measures of self-esteem were positively related to their expectations of being positively evaluated by others.

According to sociometer theory, self-esteem not only assesses and responds to the quality and quantity of an individual's actual relationships, but also monitors their eligibility for various *potential* relationships. Gilbert (1992) noted that in many species, including several non-human primates, individuals' ability to negotiate dominance hierarchies reflects their *resource holding power* (RHP), which is related principally to their size and strength. Gilbert (1992) suggested that the self-esteem system may have developed from more primitive systems designed to monitor RHP. In particular, he argued that human's abilities in negotiating social hierarchies depend on more complex attributes than are encompassed by RHP. Instead, Gilbert suggested that humans have a fundamental need to elicit positive attention from others. He referred to the ability to do this as *social attention holding power* (SAHP) and suggested that people who assess their SAHP negatively are likely to be prone to low self-esteem and depression.

Thus self-esteem should respond to individuals' assessments of their personal qualities in domains relevant to social interaction. Sociometer theory predicts that if these assessments are negative, the individual's level of self-esteem will drop, and that the sociometer should motivate the individual to try to take corrective action. Sociometer theory also predicts that the structure of self-

esteem as a psychological construct should reflect its function as a mechanism concerned with establishing and maintaining social relationships.

There is a considerable amount of evidence to suggest that dimensions of self-esteem involve attributes which are especially relevant to social interaction. Most modern treatments of self-esteem regard it as a multidimensional or hierarchical construct (Fleming & Courtney, 1984) made up of people's self-evaluations in a number of different domains together with a more global assessment of self-worth. For example, an individual may have high self-esteem with respect to his academic abilities, whilst having low self-esteem regarding his athletic abilities. As predicted by sociometer theory, many established dimensions of self-esteem are concerned with attributes which are especially important in establishing and maintaining social relationships. For example, most measures of self-esteem include subscales assessing participants' perceptions of their likeability or social skills, physical appearance, and competence in socially valued domains such as academic performance or public speaking (Blascovich & Tomaka, 1991). Furthermore, research has shown that people's self-assessments on these dimensions strongly predict their overall levels of self-esteem (Pelham & Swann, 1989). Thus, individuals are thought to derive their global sense of self-esteem from their perceptions of their qualities in specific domains which are valued by others.

1.3 Domain Specificity of the Sociometer

Recently, Kirkpatrick and Ellis (2004) have suggested a modification of Leary and Baumeister's (2000) sociometer theory. Sharing their evolutionary perspective, Kirkpatrick and Ellis (2004) argued that social inclusion is not a single adaptive problem, but rather represents a loose collection of numerous

more specific challenges. Since the characteristics of various types of relationships differ, different attributes may be required to establish and maintain them. For example, physical attractiveness may be an especially important asset when trying to attract a mate, but it is likely to be less important in maintaining relationships with family members or colleagues. Just as self-esteem is not a single unitary construct, but instead subsumes a number of specific domains, social inclusion represents a variety of specific social relationships, each with its own specific adaptive challenges. According to Kirkpatrick and Ellis' (2004) theory, this may not be coincidental: The structure of domains of self-esteem may reflect the diversity of social relationships which it has evolved to monitor and maintain.

One important dimension along which different relationships vary is the extent to which they rely on co-operation or competition. Leary and Baumeister (2000) stressed the importance of acceptance and social inclusion in their discussions of the sociometer, and relationships involving these may rely on traits including cooperation, agreeableness and conversational skills, for example. However, there are several other social situations where individuals may find themselves in competition for mates, social status or resources, and quite different attributes, including, for example, attractiveness, intelligence and dominance may be more important in these contexts. Thus, whilst agreeing with the notion that self-esteem functions to establish and maintain social relationships, Kirkpatrick and Ellis (2004) argued that these cannot simply be reduced to a general notion of social inclusion.

Since different types of relationship present different adaptive problems, Kirkpatrick and Ellis (2004) argued that instead of one general purpose sociometer, there may be several domain-specific sociometers, each monitoring

the individual's performance in a specific area of social interaction. Thus, for example, one mechanism may be concerned with monitoring one's performance in mating contexts, and another, functionally-distinct mechanism, would monitor friendships. This treatment follows from the general principle of domain specificity as conceptualised by "modular" evolutionary psychologists (e.g. Barkow, Cosmides & Tooby, 1992) whereby the human mind consists of a "cognitive toolbox" of numerous different mechanisms, each of which is designed to solve a specific adaptive challenge. This functional approach to domain-specificity differs from the more descriptive approach to the concept adopted by traditional social psychologists (e.g. Fleming & Courtney, 1984). These theorists tend to divide self-esteem into descriptive domains, for example, athletic self-esteem or academic self-esteem. In contrast, according to Kirkpatrick and Ellis' (2004) functional perspective, each domain of self-esteem represents a separate sociometer designed to monitor a specific type of relationship. Thus, there may be, for example, mating relationship self-esteem and friendship self-esteem domains.

This perspective is closely related to Harter's work on relational self-esteem (Harter, Waters & Whitesell, 1998). Harter argued that an individual's self-esteem might vary between different relational contexts. For example, the same individual may have high self-esteem in the context of same-sex peers, whilst simultaneously experiencing low levels of self-worth in the context of parents. Harter et al. (1998) found support for this theory by showing variation in the self-esteem of individual adolescents in the contexts of their relationships with parents, teachers and male and female class mates. Similarly, Anthony, Holmes and Wood (2007) conducted a series of studies which showed that people's social roles mediated the relationship between specific self-perceptions and

self-esteem. Their results showed that people with more interdependent social roles showed stronger associations between self-perceived *communal qualities* (e.g. kindness and supportiveness) and self-esteem than did those with more independent social roles. These studies support Kirkpatrick and Ellis' (2004) notion of multiple sociometers, each monitoring an individual's performance in a specific type of social relationship.

1.4 *The Importance of Sex*

Sociometer theory suggests that self-esteem monitors people's desirability as a partner in a variety of social relationships. From an evolutionary viewpoint, one of the most important of these is the sexual relationship (Dawkins, 1976). As discussed above, differential reproductive success is the driving force of evolution, and thus securing a mate with whom to reproduce is a primary adaptive challenge in all sexually reproducing species. Essentially, certain individuals who possess desirable traits are much more likely to be chosen as mates by others, and thus, on average, leave more descendents in a process known as sexual selection (Andersson & Iwasa, 1996).

Sexual selection, or "reproduction of the fittest" was a part of Darwin's original (1859/1968) theory of evolution, and was elaborated on in his (1871/1981) work "The descent of man and selection in relation to sex" and yet for a long time was largely neglected by researchers who tended to focus on the better-known concept of natural selection (Cronin, 1991). However, the power of sexual selection as an evolutionary force has become increasingly recognised, and, consequently, the concept has been used to explain many previously perplexing phenomena, such as the peacock's tail (Petrie, Halliday &

Sanders, 1991) and the elaborate constructions of male bower birds (Diamond, 1986). Sexual selection tends to drive evolution much faster than natural selection, is often associated with divergent evolution (so that closely-related species in similar habitats may have widely different sexually-selected traits), and can produce traits which are costly from the perspective of survival (Andersson & Iwasa, 1996). Evolutionary psychologists have suggested that sexual selection may have played a key part in shaping many aspects of the modern human mind, such as its unique creativity and capacity for language and abstract thought (Miller, 2000; Ridley, 1994).

Thus, if self-esteem is indeed an evolved mechanism of social comparison, as Leary et al (1995) suggest, it seems likely that it will be strongly influenced by sexual selection and specifically the extent to which individuals consider themselves desirable to potential sexual partners. From the perspective of multiple, domain-specific sociometers (Kirkpatrick & Ellis, 2004) it is likely that there is a distinct mechanism which is designed specifically to monitor the individual's mating relationship status. If this assessment is negative, the sociometer should react by causing self-esteem to drop. This contention is supported by studies which show that romantic rejection strongly undermines self-esteem (Baumeister, Wotman & Stillwell, 1993), whilst higher satisfaction with romantic relationships (Hendrick, Hendrick & Adler, 1988) and perceptions of the commitment of romantic partners (Rill, Baiocchi, Hopper, Denker, & Olson, 2009) predict higher levels of self-esteem. Furthermore, since the sociometer is thought also to be responsible for monitoring an individual's eligibility for mating relationships (Leary & Baumeister, 2000), self-esteem should reflect the individual's self-assessment of their desirability as a mate. Support for this hypothesis comes from a study by Brase and Guy (2004), who

found a significant relationship between people's self-perceived desirability and their overall level of self-esteem. Similarly, Penke and Dennisen (2008) found strong significant positive correlations between a multiple-item measure of mate value (i.e. desirability) and self-esteem in both men ($r = .61$) and women ($r = .53$).

A recent study by Pass, Lindenberg and Park (2010, study 1) provides further evidence for the present argument that self-esteem should be especially sensitive to people's self-perceptions of their desirability as a mate. They required participants of both sexes to complete fake personality inventories and then provided them with false feedback relating to their capacity as a mating or friendship partner, which was ostensibly based on their responses. Interestingly, participants who received negative feedback regarding their capacity as a mate reported lower subsequent levels of self-esteem than those who had received negative friendship-capacity feedback, and controls (who received no feedback). However, there was no significant difference in self-esteem between participants in the negative friendship feedback and control conditions. These results support the notion that there may be multiple sociometers, each of which independently monitors inclusion and eligibility for a specific type of social relationship (Kirkpatrick & Ellis, 2004). Furthermore, the results suggest that since mating relationships are of particular evolutionary importance, individuals' assessments of their eligibility for such relationships may have especially strong effects on their levels of self-esteem, from a sociometer perspective.

1.5 Desirability as Market Value

In recent years, evolutionary psychologists have extensively studied the various attributes which make up individuals' overall sexual attractiveness, or

market value (Pawlowski & Dunbar, 1999). These include a wide variety of individual traits, including dominance, intelligence, social status and access to economic resources, physical attractiveness, sense of humour, kindness and agreeableness, and parenting skills (e.g. Miller, 2000). Brase and Guy (2004), referred to a number of these traits in their single item measure of “romantic desirability”, and showed that this composite was related to global self-esteem. They split participants into three age groups; 18-25, 26-35, and over 35. They found predicted demographic trends in the data, such that desirability and self-esteem tended to decrease with age in women, whilst they increased in men, and explained these findings in the light of sex differences in the attributes which contribute to market value, as elaborated in the following paragraphs.

In general, female market value, and thus desirability, has been shown to be especially dependent on physical attractiveness (Buss, 1989). From an evolutionary perspective, female attractiveness is thought to reflect levels of fertility and reproductive potential (Thornhill & Gangestad, 1996). Thus, in order to maximise their reproductive success, males should attempt to mate with the most attractive females possible. It has been consistently shown that many aspects of female attractiveness are indeed linked to fertility. For example, women’s bodily attractiveness is known to be related to their waist-to-hip ratio (WHR) (Singh, 1993; Singh, Dixson, Jessop, Morgan & Dixson, 2010) and / or their body mass index (BMI) (Cornelissen, Tovée & Bateson, 2009; Tovée, Hancock, Mahmoodi, Singleton & Cornelissen, 2002), both of which have been shown to predict their levels of fertility (Jasieńska, Ziolkiewicz, Ellison, Lipson & Thune, 2004; Yilmaz, Kilic, Kanat-Pektas, Gulerman, & Mollamahmutoglu, 2009). Similarly, aspects of female facial attractiveness are thought to be indicative of levels of sex hormones, which themselves are linked to fertility

(Fink & Penton-Voak, 2002). Given that female fertility (Menken, Trussell & Larsen, 1986) and attractiveness decrease between the ages of 20 and 40 (Furnham, Mistry & McClelland, 2004), Brase and Guy (2004) suggested that the parallel decline in self-esteem which they reported in their own study supports their contention that it is at least partly influenced by market value.

Trivers' (1972) *Parental Investment* (PI) theory predicts that a female's reproductive success should be particularly related to the extent to which she can secure parental investment from her mate. Parental investment refers to the contribution, in terms of resources and care, which an individual makes to the rearing of offspring. In a number of cultures it has been shown that females especially value traits which relate to parental investment, such as social status, access to resources, intelligence and industriousness in potential male partners (Buss, 1989). Brase and Guy (2004) argued that these traits are likely to be more common in older men, and so the increase in self-esteem from participants aged 18-25 to those aged from 25-36 which they found in men can be explained in terms of increasing market value. The notion that self-esteem should reflect market value also receives support from a meta-analysis on the relationship between self-esteem and socioeconomic status (Twenge & Campbell, 2002). This analysis showed that the strongest relationship between these variables occurred in middle-aged men. Socioeconomic status forms an important component of the market value of these individuals (Buss, 1989), and this may explain why their self-esteem seems to be especially sensitive to this. Interestingly, however, Brase and Guy (2004) found that men aged between 26 and 35 reported having higher self-assessed market value and higher levels of self-esteem than men aged from 18 to 25, and those older than 36. Thus it was not the oldest men but rather those of intermediate age, who considered

themselves to be the most desirable. Brase and Guy (2004) suggested that this may be the result of men reaching an age where significant changes in attributes relevant to their market value, such as social status, may become increasingly unlikely. Thus, Brase and Guy (2004) provided indirect evidence that the sociometer system may be attuned to sex differences in the importance of various traits to market value.

More direct evidence for sex differences in the relationship between specific aspects of mate value and self-esteem comes from a recent study by Pass et al. (2010, study 2). These authors took photographs and physical measurements of participants and asked them to complete fake personality assessments. They then provided participants in manipulation conditions with false feedback that they were likely to be repeatedly rejected by potential romantic partners. Half of these participants were informed that this was due to their physical attractiveness (attractiveness manipulation condition) whilst the remainder were told that it was a result of their lack of competence and status (status manipulation condition). Female participants in the attractiveness manipulation condition subsequently reported lower levels of self-esteem than women in both the status manipulation and control (no feedback) conditions. Conversely, male participants in the status manipulation condition reported lower levels of self-esteem than men in both the attractiveness manipulation and control conditions. These results support the view that self-esteem responds to individuals' perceptions of their market value and demonstrate that specific aspects of mate value may differentially affect self-esteem in men and women.

It seems there is some evidence to support the prediction, derived from sociometer theory, that individuals' self-perceptions of mate value will predict

their levels of self-esteem. It follows from this that self-perceptions of traits especially important to mate value should also strongly predict self-esteem. The present research sought to further examine whether this was the case for self-perceptions of physical attractiveness by investigating the relationship between attractiveness and self-esteem from a sociometer perspective.

1.6 Overall Physical Attractiveness and Self-Esteem

To date, relatively few published studies have explicitly addressed the question of how self-esteem relates to physical attractiveness, despite the fact that many models of self-esteem assume such a link (see Mruk, 2006). Nonetheless, several studies have measured these variables in the context of examining other issues such as pre-marital sexual behaviour (e.g. MacCorquodale & Delamater, 1979; Udry & Billy, 1987), and academic achievement (Sparacino & Hansell, 1979). Feingold (1992) conducted a meta-analysis of both published and unpublished studies which measured physical attractiveness and self-esteem. He distinguished between studies which asked participants to assess their own levels of attractiveness (i.e. self-rated attractiveness) and those that employed judges to rate the participants (other-rated attractiveness). In his meta-analysis of a total of 38 samples, with 4942 participants, Feingold found a moderate positive average correlation ($r = .32$) between self-rated attractiveness and self-esteem. The analysis also found that the correlation was significantly stronger in women ($r = .32$) than in men ($r = .27$). Interestingly, Feingold (1992) found a much lower correlation between self-esteem and *other*-rated attractiveness ($r = .06$). Again, this relationship was stronger in women ($r = .09$) than in men ($r = .02$). Thus, studies suggest that

self-esteem correlates more highly with self-rated than with other-rated attractiveness, and that the relationship is stronger in women than men. These findings are reflected in the few published studies which were specifically designed to assess the relationship between attractiveness and self-esteem.

In one of the first such studies Mathes and Kahn (1976) found that self-esteem was significantly, if only weakly, correlated ($r = .24$) with judges' ratings of the overall physical attractiveness of women (rated on a single seven point scale). Further, they found no such significant correlation in men. The authors explain this sex difference by pointing out that physical attractiveness "buys more" for women in terms of forming both sexual and companionate relationships than it does for men. However, they speculate that the ultimate reasons for this are cultural in origin, such that physical attractiveness is valued more highly in women than in men in Western societies.

However, a sociometer theory perspective can provide a much more theoretically-satisfying explanation for observed sex differences in the relationship between physical attractiveness and self-esteem. Since female market value seems to be especially related to physical attractiveness (Buss, 1989), whereas male market value is more strongly related to cues to parental investment, a sociometer perspective would suggest that attractiveness should be more strongly correlated with self-esteem in women than in men. This follows directly from the notion that self-esteem should respond to individuals' assessments of their relational desirability (Leary & Baumeister, 2000). Evidence supporting this analysis comes from a study by Crocker, Luhtanen, Cooper and Bouvrette (2003) on contingencies of self-worth. Contingencies of self-worth reflect the specific traits which individuals consider most important in determining their self-esteem (Crocker & Wolfe, 2001). Crocker et al. (2003)

found that women placed a greater emphasis on physical attractiveness as a determinant of their self-esteem than did men.

It is important to note that Mathes and Kahn's (1976) study (described on the previous page) assessed the relationship between self-esteem and *other*-perceived physical attractiveness (i.e. judges' ratings). This may account for the fact that the correlation between self-esteem and attractiveness in women was weak, along with the absence of any significant correlation in the case of men. As discussed above, self-esteem is thought to be based on an individual's assessments of his or her own qualities. In the case of attractiveness it is unclear whether individuals can accurately assess themselves with respect to this. Thus, if observers do not provide similar attractiveness ratings to individuals' self-assessments, this might explain the low observed correlations between other-rated attractiveness and self-esteem. A study by Santor and Walker (1999) found a weak, non-significant, relationship ($r = .18$) between participants' ratings of their own attractiveness and the ratings of judges who were shown photographs of them. Diener, Wolsic and Fujita (1995) found similarly weak correlations between self-rated attractiveness and judges' ratings of both frontal ($r = .24$) and profile ($r = .21$) photographs, and videos ($r = .34$). An earlier study by Rand and Hall (1983) suggested that self- and other-ratings of attractiveness correlated in women but not in men. However, a more recent study by Brewer (2009) suggests that women are unable to accurately rate their own levels of attractiveness. If individuals cannot accurately assess their own levels of attractiveness, this would explain the low and non-significant correlations between other-rated attractiveness and self-esteem found by Mathes & Kahn (1976).

Diener et al. (1995) addressed this issue by assessing the relationship between both self- and other-rated attractiveness and self-esteem. They found that self-esteem showed a significant positive correlation with self-rated attractiveness ($r = .59$) in a sample consisting of both men and women. However, participants' self-esteem only correlated very weakly with others' ratings of their attractiveness based on videos ($r = .15$) and the relationship was non-significant when judges based their ratings on photographs. This study suggests that self-esteem is likely to be related to individuals' *perceptions* of their attractiveness, and accords with the findings of Feingold's (1992) meta-analysis. The studies discussed here suggest that these self-perceptions do not necessarily correspond to the evaluations of others. The discrepancy between individuals' ratings of their own level of attractiveness and the judgements of others has important implications for sociometer theory which are discussed below.

Shackelford (2001) studied married couples and assessed the relationship between interviewers' ratings of participants' physical attractiveness, and self-reported self-esteem as measured by the California Self-Evaluation Scales (CSES; Phinney & Gough, 1984; cited in Shackelford, 2001). Shackelford (2001) found that interviewer-rated attractiveness significantly correlated with global self-esteem in women ($r = .26$) but not in men ($r = .02$), following the pattern of results reported by Feingold (1992). The CSES (Phinney & Gough, 1984; cited in Shackelford, 2001) includes sub-scales measuring specific domains of self-esteem. Thus Shackelford (2001) also examined the relationship between interviewer-rated physical attractiveness and the domains of physical, social and intellectual self-esteem. These analyses revealed that interviewer-rated physical attractiveness significantly correlated with physical

self-esteem in both men ($r = .36$) and women ($r = .44$) and with social self-esteem in women ($r = .20$). However, ratings of attractiveness did not correlate with intellectual self-esteem in either sex. This analysis follows more recent theories of self-esteem that posit that it is a multidimensional construct consisting of both a global sense of self-worth and a number of sub-domains (Blascovich & Tomaka, 1991). The results reported by Shackelford (2001) suggest that physical attractiveness may only relate to specific sub-domains of self-esteem. However, since most studies on the relationship between physical attractiveness and self-esteem have tended to use uni-dimensional measures of self-worth, this issue has not been widely addressed and so warrants further investigation.

Other studies have tended to use measures of self-perceived physical attractiveness, perhaps due to the relative ease of administering these. For example, Nell and Ashton (1996) asked participants to complete Rosenberg's (1965) self-esteem scale together with two measures of self-perceived attractiveness. The first of these asked participants to rate their satisfaction with 25 aspects of their own bodies (e.g. height, chin, hair etc.) on six-point scales. The second attractiveness measure consisted of four questions asking participants to rate their overall attractiveness in comparison to somebody of the same age. Nell and Ashton found that, in their overall sample consisting of men and women, both of these measures correlated significantly with self-esteem ($r = .51$ and $.48$ respectively). Further, since women scored lower than men on all three measures, they argued that the relationship between attractiveness and self-esteem may be especially strong in women. However, since they presented no separate correlations between attractiveness and self-esteem for men and women, it is impossible to ascertain whether this was indeed the case.

1.7 Specific Aspects of Attractiveness

The above studies suggest that self-esteem is related to physical attractiveness in both sexes, as predicted by sociometer theory, and that this relationship is especially strong in women. However, physical attractiveness is unlikely to be a unitary construct; instead, it is likely to be made up of a wide variety of physical traits. At a minimum, it can be broken down into components of facial and bodily attractiveness, both of which have been extensively studied by Evolutionary Psychologists.

1.7.1 Facial Attractiveness.

According to evolutionary theory, individuals of both sexes should seek evidence of viability and good condition in potential mates, since these adaptive attributes may be passed on to any resulting mutual offspring through genetic inheritance. Traits which reliably signal heritable fitness are likely to become subject to preferences and thus be considered attractive in mate selection contexts. Gangestad and Simpson (2000) referred to this concept as Good Genes Sexual Selection (GGSS). There is now an abundance of evidence supporting this theory suggesting that attractiveness does indeed reflect underlying genetic quality. For example, overall facial attractiveness has been shown to predict both longevity (Henderson & Anglin, 2003) and, less consistently, physical health (Coetzee, Perrett & Stephen, 2009; Shackelford & Larsen, 1999). Moreover, a recent study found that facial attractiveness in males was related to their degree of heterozygosity in an area of the genome

known as the major histocompatibility complex (MHC) (Roberts et al, 2005). Specifically, this study demonstrated that men with fewer homozygous loci in this area of the genome were rated as significantly more facially attractive by women. The MHC is known to be involved in immunocompetence, such that individuals with a greater degree of MHC heterozygosity are often much less susceptible to infectious diseases such as Hepatitis (Thursz, Yallop, Goldin, Trepo & Thomas, 1997) and HIV (Carrington et al, 1999). Therefore, overall facial attractiveness does seem to operate as a reliable signal of heritable fitness in terms of health and resistance to disease.

In addition, it has been shown that many of the specific properties of attractive faces may be associated with higher genetic quality, and so their attractiveness can be explained in terms of sexual selection (see Fink & Penton-Voak, 2002, and Thornhill & Gangestad, 1999, for reviews). One aspect of facial attractiveness which suggests that it may be a cue to good genes is that faces which are judged to be the most attractive also tend to be relatively symmetrical (Grammer & Thornhill, 1994; Little, Apicella & Marlowe, 2007; Perrett et al., 1999). Fluctuating asymmetry (FA) is thought to be a reliable measure of developmental instability, and thus underlying genetic quality (van Valen, 1962). In humans, low FA (i.e. high symmetry) in various traits has been shown to correlate with physical health (Milne et al., 2003; Waynforth, 1998), psychometric intelligence (Banks, Batchelor & McDaniel, 2010; Furlow, Armijo-Prewitt, Gangestad & Thornhill, 1997) and potential fertility in women (Jasieńska, Lipson, Ellison, Thune & Ziomkiewicz, 2006). Moreover studies have demonstrated that facial asymmetry is correlated with poorer physical, emotional and psychological health (Shackelford & Larsen, 1997; Thornhill &

Gangestad, 2006). Thus a preference for symmetrical faces may well represent the operation of GGSS.

In addition, there are a number of other aspects of facial attractiveness which suggest that it may be a reliable marker of genetic quality. For example, it has long been known that, in a variety of cultures, averageness, which is related to, but distinct from symmetry (Rhodes, Sumich & Byatt, 1999), is a key component of facial attractiveness (Apicella, Little & Marlowe, 2007; see Rhodes 2006 for a meta-analytic review). Although averageness incorporates symmetry as one of its components it also consists of a multitude of other traits corresponding to the sizes and shapes of facial features and the relative positions, and distances between these, on the face (Valenzano, Mennucci, Tartarelli & Cellerino, 2006). Individuals who possess faces which are closer to the population average with respect to these factors are judged to be more attractive than individuals who substantially deviate from the mean. Averageness in phenotypic traits may signal a high degree of genetic heterozygosity, which, as discussed above, is linked to immunocompetence. Consistent with this Lie, Rhodes and Simmons (2008) showed that MHC heterozygosity predicted both facial averageness and attractiveness in males. Thus facial averageness may well serve as a sign of underlying genetic quality.

Despite this general preference for averageness, there are also some facial features which when exaggerated are considered attractive. It has been found that a large or prominent jaw and chin is generally considered to increase the attractiveness of men whilst decreasing the attractiveness of women (See Rhodes, 2006 for a review). These features are secondary sex characteristics which develop due to the influence of testosterone (see Thornhill & Gangestad, 1999). Testosterone is an immunosuppressant which reduces the effectiveness

of the immune system. These features may thus serve as an honest indicator of heritable immunocompetence since individuals who develop them have incurred a “handicap” (Zahavi, 1975) which they are able to nonetheless overcome by remaining healthy. Alternatively or additionally, since facial masculinity has been demonstrated to reliably indicate physical strength and hence resource holding power in men (Sell et al, 2009), this may explain its link with physical attractiveness.

In contrast, markers of high testosterone levels tend to decrease the attractiveness of women (see Rhodes, 2006 for a review). Smith et al. (2006) found that typically “feminine” facial features, which contribute to greater overall attractiveness in female faces, are indicative of higher levels of oestrogen in women. They argue that since oestrogen levels are linked to fertility, these aspects of female attractiveness may signal reproductive potential which is especially desirable in females (Thornhill & Gangestad, 1996).

1.7.2 Bodily Attractiveness.

The idea that aspects of physical attractiveness may reflect underlying genetic and hormonal qualities of the individual has also been employed in recent analyses of the elements of bodily attractiveness. For example, as discussed above, waist to hip ratio (WHR) seems to be an important factor in female bodily attractiveness (Singh, 1993; Singh et al, 2010). WHR is a sexually dimorphic trait, such that normal women tend to have WHRs from .67 to .80 whereas men tend to have greater WHRs of around .85 to .95. This sex difference does not emerge until puberty, when it is suggested that sex hormones, and especially oestrogen, regulate the distribution of fat to different

areas of the body. It has been shown that individuals from a variety of different age and ethnic groups consistently rate women with relatively low WHRs, of around .7, as being more attractive than those with higher WHRs (Singh, 1993; Singh et al, 2010). A number of studies suggest that WHR may be a reliable indicator of fertility and reproductive potential which form key aspects of female market value (Thornhill & Gangestad, 1996). As discussed above, WHR has been shown to predict fertility (Jasieńska et al, 2004), and it is also linked to a number of health problems which decrease fertility (Singh, 1993). This work suggests that the link between WHR and fertility is hormonal, such that relatively high levels of oestrogen lead to lower WHR and greater fertility whilst testosterone may increase WHR whilst decreasing fertility in women.

Nevertheless, this research on WHR has been challenged by recent studies which suggest that body mass index (BMI) may be a more important influence on female attractiveness. BMI is a measure of weight scaled for height, and like WHR it has been linked to both female health and longevity (see Prospective Studies Collaboration, 2009 for a recent review) and fertility (Yilmaz et al, 2009). Tovée et al. (2002) have argued that BMI is much easier to judge than WHR, and that it also explains much more of the variance in people's judgements of attractiveness (see also Cornelissen et al. 2009). Typically, a BMI of around twenty is considered to be most attractive, and this figure corresponds with BMI values associated with good health and fertility. However, Singh and Randall (2007) have used studies examining individual's judgements of the attractiveness of women who have undergone cosmetic surgery to argue that WHR may be a more important determinant of female attractiveness than BMI. Since WHR and BMI are correlated, however (Cornelissen et al, 2009), for the purposes of the present work, it is simply important to note that these specific

aspects of female bodily attractiveness concerning both overall weight and the relative distribution of body fat, may well serve as reliable markers of health and fertility, and so are likely to influence both physical attractiveness, and, from a sociometer perspective, self-esteem.

With respect to males, a number of physical characteristics have been identified which significantly contribute to bodily attractiveness. For example, it has long been known that in general taller men are considered to be more attractive (see Sear, 2006 for a review). It has been suggested that height may be important in male competition for social status and resources (Miller, 2000) and this is partially supported by a study which found that height significantly predicts wage levels in men (Loh, 1993).

Another important influence on male bodily attractiveness is waist-to-chest ratio (WCR). It has been found that males with relatively low WCRs (i.e. large chests relative to waists) are considered more attractive than those with higher ratios (Swami & Tovée, 2005; Swami et al, 2007). These low ratios correspond to an “android” body shape which develops under the influence of testosterone during puberty and have also been shown to correlate with indicators of a relatively high degree of pre-natal exposure to testosterone (Fink, Neave & Manning, 2003) as measured by second-to-fourth digit ratios. As discussed above, since testosterone acts as an immunosuppressant, low WCRs may indicate high levels of this hormone, and thus high underlying genetic quality.

1.8 Attractiveness for its Own Sake

The previous sections discussed a number of ways in which certain traits may reflect underlying genetic quality, and thus be subject to sexual selection

due to the likelihood that these genes will be passed on to potential offspring. However, there is another mechanism by which sexual selection can operate. Fisher (1930) pointed out that even an initially arbitrary preference for a certain heritable trait can quickly become established in the population through a process of runaway sexual selection. Essentially, by choosing to mate with individuals who possess the desired trait an individual increases the chances that any resulting offspring will inherit it. This will make these offspring more attractive to potential mates and thus increase, on average, the number of offspring that they themselves produce, increasing the representation of genes for the favoured trait in each new generation. At the same time, genes which promote a preference for the desired trait are also selected for and so both the trait and the preference co-evolve to become established in the population.

Runaway sexual selection has been used to explain the evolution of extravagant traits, which are costly from the perspective of individual survival, such as the peacock's tail (see Cronin, 1991). This process could also help to explain why some of the traits discussed above have become established as standards of attractiveness. For example, it has been suggested that the observed human preference for symmetry in both faces and bodies might have emerged as a result of the organisation of the visual system, which shows a processing bias towards symmetrical stimuli (Enquist & Arak, 1994). Similarly, it has been suggested that the preference for averageness in faces may have arisen as a consequence of a generalisation of the *mere exposure effect* (Zajonc, 1968; see Bornstein, 1989, for a review) whereby individuals show a preference for familiar stimuli (Rhodes, Halberstadt & Brajkovich, 2001). Thus, it can be seen that GGSS and runaway sexual selection can combine to explain why certain heritable traits are considered attractive in potential mates, as they

can increase the viability and potential reproductive success of any resulting mutual offspring.

1.9 Self-Esteem and Specific Aspects of Attractiveness

Several recent studies have examined the relationship between self-esteem and specific aspects of attractiveness. For example, several studies have assessed the relationship between body weight and self-esteem (see Miller & Downey, 1999, for a review). A BMI of greater than 25, which is defined as overweight, is generally considered unattractive in modern western societies. Miller and Downey (1999) conducted a meta-analysis of studies on the relationship between body weight and self-esteem and found a significant negative relationship between heavy (over) weight and self-esteem ($r = -.18$). From a sociometer perspective, this relationship suggests that overweight individuals are considered less attractive and thus less desirable as relational partners, and consequently have lower self-esteem. Miller and Downey (1999) found that the relationship between self-perceived heavy weight and self-esteem ($r = -.34$) was stronger than the relationship between objectively measured, or other-rated heavy weight and self-esteem ($r = -.12$). These results mirror the findings of Feingold (1992) that self-perceived attractiveness shows a stronger correlation with self-esteem than does other-rated attractiveness. Thus, individuals' self-esteem seems to relate more to their self-perceptions, rather than their objective qualities.

Miller and Downey (1999) also found that in combined studies examining both self- and other-perceptions of body weight, the relationship between heavy weight and self-esteem was significantly stronger in women ($r = -.23$) than men

($r = -.19$). Again, this accords with the similar sex difference in the relationship between attractiveness and self-esteem reported by Feingold (1992). Miller and Downey (1999) suggest that the stronger relationship between heavy weight and self-esteem in women might be explained in terms of social expectations for women to be thin. However, the observed sex difference can also be explained in terms of the impact of self-perceived market value on self-esteem. Since physical attractiveness is thought to be more relevant to market value in women than men (Buss, 1989), body weight, which affects physical attractiveness, should have a correspondingly greater relationship with self-esteem in women.

A subsequent study by Frost and McKelvie (2004) further investigated the relationship between body weight and self-esteem in samples of elementary, high school and undergraduate students. This study assessed the discrepancy between participants' actual and ideal weights, as measured by objective BMI and by asking participants whether they were satisfied with their weight. Body image was measured by asking for participants' own subjective comparisons between themselves and silhouette figures. It was found that generally males wanted to be heavier than they actually were, whereas females would prefer to be lighter. These results might reflect the finding that males tend to emphasise muscular bulk, which would correspond to a relatively high BMI, in their judgements of male attractiveness (Swami & Tovée, 2008). These results of Frost and McKelvie's (2004) study together with the finding that objectively measured BMI did not correlate significantly with self-esteem in either sex support the findings of Miller and Downey (1999). Thus these results seem to suggest that whilst self-esteem is related to self-perceived body weight and build in both sexes, women seem to be more concerned with being thin,

whereas male self-esteem may be more related to muscularity. This latter finding may reflect evolutionary analyses of physical attractiveness preferences, which suggest that muscularity in men is desirable because it reflects genetic quality (Frederick & Haselton, 2007) and may be advantageous in intrasexual competition for status and resources (Sell et al, 2009).

Whilst body weight forms an important component of bodily attractiveness, it is by no means the only determinant of this. Frost and McKelvie (2004) assessed the relationship between self-esteem and participants' scores on the Body Cathexis Scale (BCS; Secord & Jourard, 1953). This measures body image by asking participants to rate their satisfaction with various parts of their bodies on seven-point scales. This approach to assessing body image has been adopted by subsequent popular measures such as the Body Esteem Scale (BES; Franzoi & Shields, 1984). Frost and McKelvie (2004) found that self-esteem significantly correlated with the BCS in both men ($r = .46$) and women ($r = .44$). Thus overall body image seems to be related to self-esteem to a similar extent in both sexes. Although it seems likely that there will be sex differences with respect to which specific body parts are most related to self-esteem, this is impossible to assess from the study by Frost and McKelvie (2004), since they did not report results for individual items within the scale. This issue thus warrants further investigation.

Some studies have attempted to investigate which body parts are most implicated in self-esteem, by using more recently developed multi-dimensional measures of body image. For example, Wade and Cooper (1999) examined the relationship between participants' scores on Rosenberg's (1965) self-esteem scale (SES) and on the multiple body self-relations questionnaire (MBSRQ; Brown, Cash & Mikulka, 1990). The MBSRQ measures people's evaluations of

their body image in three domains of health, appearance and fitness. Using this measure, Wade and Cooper (1999) found that women's evaluations of their fitness predicted their levels of self-esteem, but that evaluations of appearance did not. In contrast, none of the MBSRQ subscales predicted global self-esteem for men. These findings challenge the sociometer approach employed by Brase and Guy (2004) which suggests that since attractiveness influences market value, it should also predict self-esteem (see also Penke & Denissen, 2008).

Several other studies have examined correlations between global self-esteem and the Body Esteem Scale (BES: Franzoi & Shields, 1984); a widely used multidimensional test of individual's feelings about various aspects of their bodies. This test includes separate sex-specific sub-scales measuring sexual attractiveness, weight concern and physical condition in females, and physical attractiveness, physical condition and upper body strength in males. It asks participants to rate their feelings about specific body parts (e.g. nose, arms, legs) and more general physical traits such as muscular strength and physical condition, on a five-point scale, ranging from 1 (*have strong negative feelings*) to 5 (*have strong positive feelings*). As part of their validation procedure, Franzoi and Shields (1984) examined correlations between their BES subscales and participants' scores on Rosenberg's (1965) SES. They found significant correlations for the BES subscales of physical attractiveness ($r = .50$), upper body strength ($r = .45$) and physical condition ($r = .51$) in men, and correlations for sexual attractiveness ($r = .32$) and physical condition ($r = .35$) in women. The only non-significant correlation was found between weight concern and global self-esteem in women. However, a replication study by Franzoi and Herzog (1986) found slightly different significant correlations for physical attractiveness ($r = .26$), upper body strength ($r = .25$) and physical condition ($r = .40$) for men,

and correlations for sexual attractiveness ($r = .21$), weight concern ($r = .36$) and physical condition ($r = .39$) for women. These studies support the sociometer hypothesis by showing that self-esteem is at least partially related to the extent to which individuals consider themselves to be physically attractive. However, the discrepancies between the two studies suggest that a further replication would be beneficial.

Wade (2000) administered, to a sample of undergraduates, the BES together with the Rosenberg (1965) SES and two questions asking participants to rate their physical and sexual attractiveness on seven-point scales. He found that the only significant predictor of self-esteem in women was the sex appeal subscale of the BES which includes participants' ratings of their feet, sexual organs, stomach, health, body hair, breasts, face, body scent, nose and cheekbones. Men's feelings about their face and reflexes were the only significant predictors of their levels of self-esteem. Wade (2000) argued that the sex appeal subscale includes several items which reflect a woman's level of fertility, which as discussed above is an important contributor to her market value. Whilst he did not make reference to sociometer theory, Wade developed a similar argument that the reason why these traits are linked to self-esteem is that they represent important variables concerning the acquisition and retention of mates. Wade (2000) also argued that since men's developmental stability, and thus underlying genetic quality, can be inferred from their faces (Gangestad, Thornhill & Yeo, 1994), this explains the link between their feelings about this trait and their overall levels of self-esteem. Nevertheless, given that men's bodies do have implications for their attractiveness (Swami & Tovée, 2005; Swami et al, 2007), it is interesting to note that Wade (2000) found that men's feelings about their bodies did not significantly predict their levels of self-

esteem. This discrepancy between theory and empirical evidence warrants further investigation.

1.10 Outline of the Present Research

The present research sought to extend the research reviewed above to further examine the relationship between physical attractiveness and self-esteem. Much of this prior research has been somewhat atheoretical, and for this reason, the present research sought to examine this relationship from the specific theoretical perspective of sociometer theory. Study 1 attempted to extend previous research on the relationship between physical attractiveness and self-esteem by addressing some general limitations of research in this area, and by examining specific hypotheses explicitly derived from sociometer theory. More specifically, Study 1 examined the relationships between a multiple-item, social comparison based measure of self-perceived attractiveness, various specific aspects of bodily attractiveness and both global and sub-domains of self-esteem. These measures were chosen in order to address some of the limitations of previous studies, which have typically used unidimensional measures of these variables, and which have ignored the essentially relative nature of physical attractiveness.

Studies 2 to 4 sought to examine specific causal hypotheses surrounding the nature of the relationship between self-perceptions of physical attractiveness and self-esteem. Previous research in this area has been almost exclusively correlational, and so it cannot address the question of whether self-perceptions of attractiveness and self-esteem causally influence each other. However, several theories of self-esteem, including sociometer theory, assume causal influences between self-perceptions and this construct, and the present

lack of evidence bearing on these influences represents a significant gap in the literature. Consequently, Studies 2 and 3 were experiments designed to assess whether manipulating self-perceived attractiveness affects self-esteem and Study 4 examined whether an experimental manipulation of self-esteem affected self-perceived attractiveness.

Finally, Study 5 investigated relationships between self-perceived relational desirability, self-esteem and specific relational behaviours. Leary and Baumeister (2000) presented considerable evidence to support their suggestion that self-esteem responds to self-assessments of relational value and inclusion. However, there is currently little evidence to support the hypothesis, derived from sociometer theory, that self-esteem functionally regulates relational behaviour. Study 5 sought to investigate this hypothesis in the context of romantic relationships. Thus, the present research represented a systematic attempt to examine the relationship between self-perceived physical attractiveness and self-esteem from the perspective of sociometer theory.

CHAPTER 2

STUDY 1: THE RELATIONSHIP BETWEEN PHYSICAL ATTRACTIVENESS AND SELF-ESTEEM

2.1.1 Aims of Study 1

Chapter 1 reviewed a number of studies which have investigated the relationships between self-esteem and attractiveness. Although these generally suggest that there is a positive correlation between these variables, there is some disagreement over the strength of the relationship, and also whether or not it is present in both sexes. Thus the aim of Study 1 was to replicate and extend these findings by investigating the relationships between self-perceived facial and bodily attractiveness and self-esteem in an undergraduate sample.

2.1.2 Limitations of Previous Research

The studies described in Chapter 1 generally support sociometer theory by establishing a link between physical attractiveness and self-esteem. However, each of them has a number of important limitations and there are also some methodological issues which run through the literature in general.

Perhaps most importantly, the way in which all of the reviewed studies attempt to measure self-perceived attractiveness can be criticised on methodological grounds. Most previous studies have measured self-perceived attractiveness using just one or two simple statements to which participants indicate their level of agreement. For example, Brase & Guy (2004) used a single item to measure their participants' self-perceived market value, which drew their attention to specific traits contributing to this and then asked "Overall, how would you rate your level of desirability as a partner on a scale of 1-9 (1 =

extremely desirable to 9 = extremely undesirable)". Similarly Wade and Cooper (1999) and Wade (2000) simply asked participants to rate their level of attractiveness on a single seven-point scale. Such single-item approaches are likely to suffer from a number of methodological problems. Internal consistency, for example, which is often considered the standard metric of reliability (e.g. Schmitt, 1996), cannot be assessed for such single item measures. Moreover, such measures are likely to be heavily influenced by temporally inconsistent factors such as mood, recent relevant life experiences, and testing context, and so it is generally recommended that researchers use multiple-item measures where possible (Rust & Golombok, 2009).

There is an additional, more specific problem with several previous approaches to measuring self-perceived attractiveness. As discussed in Chapter 1, many interpersonal approaches to self-esteem, including sociometer theory, stress the importance of social comparison processes in the development and maintenance of self-esteem (Barkow, 1989; Leary & Baumeister, 2000; Maslow, 1937; Mead, 1934/1967). Similarly, there is a growing body of evidence which suggests that these same processes influence people's perceptions of their own levels of attractiveness. For example, Richins (1991) found that exposing women to idealized images of physical attractiveness (i.e. pictures of extremely attractive women) temporarily lowered their levels of self-perceived attractiveness. This result has been supported by several subsequent studies demonstrating that exposing women to "thin-ideal" images leads to subsequent decreases in their level of body satisfaction (see Want, 2009 for a recent meta-analytic review). However, none of the studies linking attractiveness to self-esteem adequately take these social comparison effects into account. Most simply ask "how attractive do you consider yourself to

be?” to which participants could conceivably answer “in comparison to whom?” Clearly, if some participants are comparing themselves to close peers, whilst others are considering themselves relative to professional models, then researchers might obtain quite different responses from participants who, in reality, would actually consider themselves to be equally attractive.

In an attempt to overcome these limitations, the present study employed a newly developed comparison measure of self-perceived facial attractiveness devised by the present author (Bale, 2004). This method of measuring self-perceived facial attractiveness involves asking participants to rate their attractiveness in comparison to a number of pictures of same-sex and opposite-sex faces which have been previously rated for attractiveness. This method has been shown to benefit from a high degree of internal consistency (Cronbach alpha = .89) and scores on this correlate significantly with a widely-used single-item measure of self-perceived facial attractiveness ($r = .67$). Furthermore, this method accounts for the social comparison aspect of self-perceived attractiveness by explicitly requiring participants to compare themselves to other individuals.

Another important limitation of many of the studies discussed in Chapter 1 is that, with the exception of Shackelford’s (2001) study on self-esteem in married couples, they typically use a unidimensional measure of self-esteem; often the Rosenberg (1965) SES. However, most modern theories of self-esteem posit that it is a multidimensional construct consisting of both a global sense of self-worth together with a number of sub-domains (Blascovich & Tomaka, 1991). For example, Fleming and Courtney’s (1984) analysis of various scales led them to argue that self-esteem has a hierarchical structure, with various specific facets contributing to the individual’s overall self-

evaluation. Similarly, Bracken, Bunch, Keith and Keith (2000) conducted a factor analysis on five different popular measures of self-esteem, and found evidence of the following six domains underlying a super-ordinate construct of global self-esteem in children and adolescents; social, physical, affect, competence, family, and academic self-concept.

Sharing this theoretical outlook, a number of more recently-developed measures of self-esteem incorporate sub-scales measuring various facets of this construct. For example the Self-Description Questionnaire, developed by Marsh, Smith and Barnes (1983) to measure self-esteem in children, consists of sub-scales measuring domains of physical abilities, appearance, relationship with peers, relationship with parents, reading, mathematics and other school subjects. Similarly, Fleming and Courtney (1984) revised Janis and Field's (1959 cited in Blascovich & Tomaka, 1991) Feelings of Inadequacy scale to incorporate sub-scales of social confidence, school abilities, self-regard, physical appearance and physical ability. These multidimensional approaches to the measurement of self-esteem are also reflected in the work on relational domains of self-esteem conducted by Harter et al. (1998) described in Chapter 1, above.

The fact that most of the studies which investigate the relationship between physical attractiveness and self-esteem detailed above use a unidimensional measure of the latter construct represents an important limitation of past research. It seems likely that not all domains of self-esteem will be equally related to physical attractiveness. Instead, as the results of Shackelford (2001) suggest, it may well be the case that specific domains, such as attractiveness and romantic self-esteem will show a stronger relationship with self-perceived physical attractiveness, than, for example, academic self-esteem. The present

research addresses this limitation by examining how aspects of physical attractiveness relate to a multidimensional measure of self-esteem, namely the Personal Evaluation Inventory or PEI (Shrauger & Schohn, 1995), which incorporates sub-scales of academic performance, athletics, physical appearance, romantic relationships, social interactions, and speaking with people.

In addition, the present study measured global self-esteem using the 10-item Rosenberg (1965) self-esteem scale (SES). This instrument is the most widely used measure of self-esteem in the literature and was used in many of the studies on attractiveness and self-esteem described above (Brase & Guy, 2004; Franzoi & Shields, 1984; Franzoi & Herzog, 1986; Mathes & Kahn, 1975; Nell & Ashton, 1996; Wade & Cooper, 1999; Wade, 2000). Including this measure in the present study allowed direct comparisons to be made between the results of the current and previous studies. The final instrument included in the present study was the Body Esteem Scale (BES: Franzoi & Shields, 1984) which measures participants' attitudes towards various parts of their bodies as well as more general attributes relating to physical condition.

2.1.3 Predicted Relationships Between Attractiveness and Self-Esteem.

On the basis of previous research and sociometer theory, it was predicted that there would be a moderate significant positive correlation between self-rated facial attractiveness, as measured by the face comparison method (Bale, 2004) and both the SES (Rosenberg, 1965) and the global measure in the PEI (Shrauger & Schohn 1995). Given that female market value is especially

dependent on physical attractiveness (Buss, 1989), and based on previous research (Feingold, 1992), it was predicted that this correlation would be stronger in women than in men. It was also predicted that there would be a significant positive correlation between the BES (Franzoi & Shields, 1984) and both the SES (Rosenberg, 1965) and the global measure of the PEI (Shrauger & Schohn, 1995).

Based on theoretical perspectives of the domain specificity of self-esteem (Kirkpatrick & Ellis, 2004), it was predicted that self-rated facial attractiveness should correlate more highly with the appearance and romance than with the other (academic, athletic, social interaction and speaking with people) subscales of the PEI. This is based on the likelihood that attractiveness is an especially important factor contributing to self-esteem in the former domains. It was also predicted that the correlations between self-rated facial attractiveness and appearance and romantic self-esteem should be higher in women than in men, reflecting the fact that facial attractiveness may form an especially important component of overall attractiveness and therefore romantic appeal in women (Buss, 1989).

2.1.4 Predicted Relationships Between Global and Specific Aspects of Self-Esteem

Sociometer theory predicts that self-esteem should be particularly dependent on individuals' perceptions of their competencies in domains relevant to success in various types of social relationships (Leary & Baumeister, 2000). As discussed above, evolutionary theory predicts that establishing and

maintaining sexual relationships presents one of the most important adaptive social challenges for the individual. Thus global self-esteem should be especially sensitive to individuals' assessments of their competencies in domains which have a direct bearing on their ability to attract and retain mates. On this basis, it was predicted that the correlations between participants' scores on global self-esteem, as measured by the SES, should be significantly higher with the appearance and romance sub-scales of the PEI than with the other (academic, athletic, social interaction and speaking with people) sub-scales.

Both the evolutionary theory of market value and the general literature on self-esteem suggest that the present study should uncover other sex differences in the relationships between specific aspects of this trait, in the form of PEI sub-scales, and the global Rosenberg (1965) measure. In general, it has been found that women's self-esteem is more dependent on feelings of worthiness, or broadly, social acceptance, whereas men tend to focus more on their competencies, or degree of success in various domains (see Mruk, 2006 for a review). Similarly, Josephs, Markus and Tarafodi (1992) suggested that male self-esteem is often based on feeling independent of, and superior to others, whereas female self-esteem is more dependent on feeling sensitive and connected to others. From the multiple sociometer perspective of Kirkpatrick and Ellis (2004), men may place a greater emphasis on their status in competitive interactions whereas women seem to be more concerned with their performance in co-operative social contexts. Evidence for this contention comes from a study by Crocker et al (2003) who found that female college students reported basing their self-esteem on the approval of others and on family support to a greater extent than did male students.

Traditionally, such differences have been explained in terms of the influence of cultural expectations regarding gender roles on people's self-esteem, but there may also be a more biological, evolutionary explanation. In many species, including humans, it is primarily males who compete for access to females, either directly by fighting, or by displaying their genetic quality or social status and access to resources as evidence of potential parental investment (Trivers, 1972). In contrast, at least in many species of primates, and also possibly humans, females place a great emphasis on maintaining social bonds, in order to secure mutual protection and non-parental care for their offspring (Hrdy, 2000; see also Geary, Byrd-Craven, Hoard, Vigil & Numtee, 2003).

These theoretical considerations lead to the following hypotheses with respect to the present study. First, it is expected that there should be a stronger correlation between the athletic sub-scale of the PEI (which measures self-perceived sporting competence) and global self-esteem in men than in women. It has been suggested that many sports represent an arena in which men, in particular, compete to display their physical prowess, in order to impress and gain access to women (Farrelly & Nettle, 2007; Schulte-Hostedde, Eys & Johnson, 2008). Support for this contention comes from a study by Faurie, Pontier and Raymond (2004) who found that, whilst both men and women who engaged in sports reported having more sexual partners than their non-sporting peers, the effect was significantly more pronounced in men. Thus, if self-esteem is indeed dependent on market value, it might be expected that it would be more related to athletic prowess in men than in women.

The academic sub-scale of the PEI measures people's perceptions of their scholastic competence, which seems likely to be strongly related to the extent

to which they consider themselves to be intelligent. Miller (2000) has argued that human intelligence largely evolved as a means of displaying genetic quality, which, as discussed above, is an important factor in mate choice. He suggests that men evolved high intelligence in order to display their genetic quality to women, who themselves developed the intellect to assess that of the males. This contention is supported by studies which show correlations between IQ and other indicators of genetic quality, such as symmetry (Banks et al, 2010) and health and longevity (see Gottfredson & Deary, 2004, for a review), and by Buss' (1989) finding that, across cultures, intelligence plays an important part in mate choice. Furthermore, given that intelligence is strongly correlated with both monetary income and socio-economic status (Herrnstein & Murray, 1996; but see also Zagorsky, 2007), it may serve as an important indicator of potential parental investment in men. All of this suggests the hypothesis that, in the present study, the academic sub-scale of the PEI should correlate more strongly with global self-esteem in men than in women.

The speaking with people sub-scale of the PEI contains items which pertain to people's perceptions of their competency in delivering public speeches and presentations. Burling (1986) has argued that historically, in many cultures public speaking has been key in allowing men to attain high social status, and consequently, access to mates. Following from this, it is hypothesised that in the present study, the speaking with people sub-scale of the PEI will correlate more highly with global self-esteem in males than in females.

Thus it is hypothesised that given that the athletic, academic and speaking with people sub-scales of the PEI pertain to competencies in domains which are likely to be more strongly related to market value in men than in women, the relationship between these and global measures of self-esteem should be

stronger in the former group than the latter. In contrast, given that women seem to be especially concerned with social acceptance (Mruk, 2006) and maintaining social bonds (Hrdy, 2000), the relationship between scores on the PEI social interaction sub-scale and global self-esteem is predicted to be stronger in women than in men.

2.2 METHOD

2.2.1 Participants

Participants were recruited by sending an email to all students at the University of Liverpool ($n = 155$), and by distributing flyers to undergraduate psychology students at the University of Central Lancashire ($n = 145$). These briefly explained the background to the study and invited people to take part, either by following a link to the web pages containing the study placed in the email, or by giving the address of the web-site on the flyers.

The data was filtered to exclude probable instances of multiple responding by the same individuals (see section 2.2.3 below). This left 108 men and 192 women who made up the 300 participants who responded to the study. Participants were aged between 19 and 50 (mean = 23.5, SD = 5.0).

The design of the study allowed participants to complete some parts of the test without finishing the study as a whole. This meant that different sample numbers were obtained for each part of the study. Therefore separate sample numbers are reported for each of the statistical analyses conducted and described below.

2.2.2 Materials

2.2.2.1 Facial Attractiveness Scale

In order to measure participants' self-perceived facial attractiveness, a development of a recently devised test by the present author was used (Bale, 2004). This computer-based test asks participants to compare their own attractiveness, on a 7-point Likert scale, to that of a series of pictures of men's

and women's faces, which have been previously rated on this. A rating of 1 on the scale indicates that the participant considers him- or her-self to be *much less attractive* than the face presented, whilst scores of 4 and 7 correspond to *equally attractive* and *much more attractive* respectively. Responses are scored in the following manner. Since ratings of 4 correspond to *equally attractive* these receive a score equal to the mean attractiveness rating of the face presented. Ratings of 1, 2 and 3, correspond to degrees of *much less attractive* and thus receive scores equal to the mean rating for the face presented, minus 3, 2 and 1 respectively. Conversely, ratings of 5, 6 and 7 correspond to degrees of *much more attractive* and thus receive scores equal to the mean rating for the face presented, plus 1, 2 or 3 respectively. Thus the formula for scoring the test is:

$$\text{Score} = \text{mean attractiveness rating for picture} + (\text{participants response} - 4)$$

and total test scores were simply the sum of the scores for all of the items.

This test was found to show a high degree of reliability, in terms of internal consistency (Cronbach's Alpha = .89), and scores on it correlated moderately but significantly ($r = .67$, $p < .05$) with a popular single-item measure of self-perceived facial attractiveness (Bale, 2004).

Study 1 utilised this comparison approach to measuring self-perceived facial attractiveness for both sexes. Comparison stimuli were constructed for each sex by digitally combining 50 colour JPEG images of faces which had been previously rated for attractiveness: 25 male or female face stimuli were generated such that the two lowest-rated images were combined, then the next two lowest, proceeding in that fashion up to the two highest rated pictures. This

method was employed to try to ensure that there would be sufficient variance in the attractiveness of the stimuli to which participants would compare themselves.

The 25 male and 25 female composite-face stimuli were then rated for attractiveness, on a 7-point Likert scale, by 64 undergraduate psychology students of the University of Liverpool. The mean ratings for the stimuli ranged from .88 to 4.22 for the female and from 1.00 to 3.61 for the male faces, and approximately corresponded to the ratings for the original pictures from which they were constructed.

These stimuli were then used to construct male and female comparison computer-based tests of self-perceived attractiveness. In accordance with the Bale (2004) study described above, participants were asked to compare themselves to both same-sex and opposite-sex faces. For the same-sex test, participants were instructed to “Please compare your own face to the faces below for attractiveness” on a seven-point scale where one corresponded to “my face is much *less* attractive”, four to “same” and seven to “my face is much *more* attractive”. For the opposite-sex test, participants were instructed as follows: “In the next set of ratings you will see photos of the opposite-sex. When judging your face against theirs consider whether you think they would consider you as a potential partner.” Ratings corresponded to the same descriptions as for the same-sex test.

Scores for the tests were calculated in the same way as described above (Bale, 2004); the same and opposite sex scores were summed to produce an overall score of self-perceived facial attractiveness.

2.2.2.2 Global Self-Esteem

Rosenberg's (1965) 10-item Self-Esteem Scale (SES) was the primary measure of global self-esteem used in the present study. This test asks participants to indicate their feelings towards 10 self-descriptive statements on a four-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). This is the most widely used measure of self-esteem in the literature, and it shows a high degree of internal consistency (Cronbach's Alpha = .88: Fleming & Courtney, 1984). Scores on this test have also been shown to strongly correlate with a number of other popular measures of self-esteem (Blascovich & Tomaka, 1991). In addition, the test is relatively short and easy to score. All of this makes it ideal for the purposes of the present study.

In addition, global self-esteem was measured using overall scores on the Personal Evaluation Inventory (PEI) (Shrauger & Schohn, 1995), described below.

2.2.2.3 Dimensions of Self-Esteem

Specific aspects of self-esteem were measured using the PEI (Shrauger & Schohn, 1995). This 54-item test measures global self-esteem (defined as feelings of confidence) as well as specific domains of academic performance, athletics, physical appearance, romantic relationships, social interactions and speaking with people. This test asks participants to indicate their feelings towards 54 self-descriptive statements on a four-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). It shows a high degree of internal consistency (Cronbach's Alpha = .87) and a moderate, significant, correlation

with other widely used measures, such as Rosenberg's (1965) Self-esteem Scale ($r = .58$: Shrauger & Schohn, 1995). In addition, the test was developed on a sample of university students and so most of the items are particularly relevant to this group. All of this makes the PEI an ideal choice for measuring dimensions of self-esteem in the present study, which was conducted on a sample largely consisting of university students.

Despite the demonstrably good psychometric properties of the instrument, and its apparent utility as one of the most recently developed multidimensional measures of self-esteem, this scale has not been widely used in the literature. Thus, its inclusion in the present study also presented the opportunity to further assess its utility as a psychometric tool.

2.2.2.4 Dimensions of Physical Attractiveness

Participants' attitudes towards specific aspects of their bodies and physical attractiveness were measured using the 35-item Body Esteem Scale (BES: Franzoi & Shields, 1984). This popular instrument measures participants' global attitudes towards their bodies and also includes sex-specific subscales relating to various aspects of this. For women, the test includes subscales measuring sexual attractiveness, weight concern and physical condition. For men, subscales measure physical attractiveness, upper body strength and physical condition. The test consists of a list of body parts and functions, and participants indicate their feelings towards each of them on a scale of one to five corresponding to *have strong negative feelings* and *have strong positive feelings* respectively.

The measure has been shown to have adequate internal consistency, with subscale Cronbach's Alpha values ranging from .78 to .87, and it shows an

overall correlation of .51 with the Rosenberg (1965) Self-Esteem Scale (Franzoi & Shields, 1984). In common with the PEI, described above, the test was developed on an undergraduate sample, making it ideal for measuring aspects of physical attractiveness in the present study.

2.2.3 Procedure

The first page of the study informed participants that they would be asked to rate same-sex and opposite-sex faces, and to fill in some short questionnaires. They were informed that their participation was voluntary, that they could terminate the study at any time and should not answer any questions with which they felt uncomfortable, and that their responses would be treated anonymously. Next, they were asked to report their age and sex using response boxes in the form. They were also asked to provide an identity number in the form of either their university student number or their home postcode. In addition, the study recorded an ID number for the computer on which each set of responses was completed. This data allowed the identification and matching of responses to participants, and also for the identification of instances of the same individuals completing the test multiple times. Responses with duplicate personal or computer ID codes were excluded from subsequent analyses.

Participants proceeded to the next page of the study by pressing a button labelled "submit" at the bottom of the page, which also sent the data from this first page to the file server which was used to record and store results.

The next page of the study contained the 10-item Rosenberg SES. The 10 statements relating to self-esteem which make up the scale were displayed on this page and participants were asked to click on one of four boxes, ranging from *strongly agree* to *strongly disagree* to indicate their attitude towards each

of the items. Again, participants proceeded to the next page in the study by pressing “submit”, and this also sent their data to the server.

The next page of the study contained the BES measure. Participants were informed that the page listed a number of body parts and functions, and that, for each one, they were to input a number, ranging from one to five, into the adjacent box, indicating their feelings towards it. The number one corresponded to *have strong negative feelings*, three to *have no feeling one way or the other* and five to *have strong positive feelings*. Participants proceeded to the next page by pressing “submit”.

The next page of the study contained the first picture for the same-sex comparison measure of facial attractiveness described above. Thus women rated themselves against female faces; men rated against those of males. This part of the test contained the instructions and response scale detailed above. Each picture was presented on a separate web page, and as soon as the participant had supplied a response by clicking on the box that best represented their feelings, the data was sent to the server and the next page appeared. The order of presentation of the comparison faces was randomised for each participant. When the participant had responded to the final twenty-fifth image, the study proceeded to the next part of the test.

The next page of the study displayed the 54 statements comprising the PEI. Participants were asked to indicate the extent to which they agreed with each statement on a four point scale, displayed next to it, ranging from *Strongly agree* to *Strongly disagree*, by checking the appropriate circle. Again, the study proceeded when participants clicked on “submit”.

The next webpage consisted of the instructions for the opposite-sex comparison facial attractiveness scale, described above, and participants

proceeded to this test by pressing a button labelled “start rating”. This part of the study proceeded in exactly the same fashion as the same-sex test described above, except that, having been asked to consider whether the individuals depicted would consider them as a potential partner, male participants were now rating themselves in comparison to female faces, and females to those of males.

The final page of the study consisted of a message thanking participants for their time, and giving contact details for the researcher. Participants were informed to contact the researcher should they wish to withdraw their data, or if they would like feedback about the aims and results of the study. The final page also gave details of a counselling service available to students who wanted to discuss any of the issues involved in the study. The data, which was stored on the file server used in the study, was subsequently downloaded and input into the SPSS statistical software package for analysis.

2.3 RESULTS

2.3.1 Reliability and Validity of Study Measures

The first stage in the analysis of the data involved assessing the reliability and validity of the newly-developed facial attractiveness scales, in order to confirm their utility as psychometric measures of self-perceived attractiveness. Cronbach's alpha was used to assess the internal consistency of the scales. Both the male ($\alpha = .97$, $n = 261$) and female ($\alpha = .97$, $n = 263$) comparison measures showed very high degrees of internal consistency, as did the overall scale comprising of both of these tests ($\alpha = .98$, $n = 251$).

With respect to the validity of the measures, a Pearson product-moment correlation revealed that the male and female scales showed a strong significant positive relationship with each other ($r = .81$, $p < .05$, $n = 251$). This suggests that people can assess their attractiveness in comparison to individuals of both the same and opposite sex. Pearson product-moment correlations were also calculated between overall scores on both face scales and subscales of the Body Esteem Scale. It was found that, for men ($n = 75$) self-perceived facial attractiveness significantly correlated with the Physical Attractiveness ($r = .40$, $p < .05$), and, to a lesser extent, the Physical Condition ($r = .26$, $p < .05$), but not the Upper Body Strength, subscales of the BES. For women ($n = 168$), the facial attractiveness scale correlated with Sexual Attractiveness ($r = .58$, $p < .05$), Weight Concern ($r = .49$, $p < .05$), and Physical Condition ($r = .29$, $p < .05$). In addition, a score for all of the items in the BES which refer to parts of the face (i.e. "nose", "lips", "ears", "chin", "appearance of eyes", "cheeks / cheekbones" and "face") was calculated for each participant ($n = 243$) and this showed a significant moderate positive relationship ($r = .54$,

$p < .05$) with scores on the face scales. Finally, both scales showed a moderate but significant correlation ($r = .63$, $p < .05$, $n = 207$) with scores on the Appearance sub scale of the PEI.

Overall, these findings suggests that the face scales developed here provide reliable measures of self-perceived facial attractiveness, which in turn correlate with general self-ratings of attractiveness.

Since the PEI has been rarely used in self-esteem research, the present study presented an opportunity to further assess its utility as a psychometric tool. In total, 214 participants had provided responses to all of the items on the scale, which was found to show a high level of internal consistency ($\alpha = .87$). In addition, overall scores on the PEI showed a strong and significant positive relationship with those on the Self-Esteem Scale ($r = .80$, $p < .05$, $n = 212$). This suggests that this test constitutes a reliable and valid measure of global self-esteem in individuals in the present study.

2.3.2 Relationships Between Physical Attractiveness and Self-Esteem

In order to investigate the possible relationship between facial attractiveness and global self-esteem in the present study, Pearson product-moment correlations were calculated between scores on the facial attractiveness scale and those on the Self-Esteem Scale and overall PEI. Table 1 shows the resulting correlation coefficients and the sample sizes upon which they are based.

Table 1:

Relationships Between Self-Perceived Facial Attractiveness and Global Self-Esteem.

Facial Attractiveness Score	SES	N	PEI	N
Overall	.39 *	245	.50 *	207
Males	.32 *	75	.46 *	61
Females	.43 *	170	.55 *	146

SES = Self-Esteem Scale, PEI = Personal Evaluation Inventory

* $p < .05$

Table 1 indicates that when the sexes are considered together, self-perceived facial attractiveness shows a moderate significant relationship with scores on the SES and a strong significant correlation with scores on the PEI. It is also apparent that both measures of self-esteem correlate more strongly with self-perceived attractiveness in women than in men, which can be seen as partial support for the hypothesis that self-esteem is linked to market value. However, Fisher's r to z transformations showed these sex differences in the relationships between self-perceived facial attractiveness and scores on the SES ($z = .91$, $p = .36$) and PEI ($z = .78$, $p = .44$) to be non-significant in the present sample, although this has been shown to be a conservative test (Zimmerman, Zumbo & Williams, 2003).

The relationship between self-perceived bodily attractiveness and global self-esteem was also assessed by calculating Pearson product-moment

correlations between the Body Esteem Scale, including its sex-specific subscales, and the overall PEI and SES scores. These statistics, together with the sample sizes on which they are based, are displayed in Table 2, below.

As expected, there were moderate significant positive overall relationships between scores on the Body-Esteem Scale and both the Self-Esteem Scale and Personal Evaluation Inventory measures of global self-esteem. In the case of the SES, these correlations are comparable in both sexes. Interestingly, however, the correlation between body esteem and self-esteem, as measured by the PEI, was stronger in women than in men, supporting the contention that physical attractiveness may be especially important to female self-esteem. However, again, Fisher's r to z tests were calculated and these revealed no significant sex difference in correlations between body esteem and the SES ($z = .12$, $p = .90$) and PEI ($z = .74$, $p = .46$) measures of self-esteem.

Table 2 also displays correlations between specific aspects of body esteem, in the form of the BES subscales, and global self-esteem. These results suggest that self-esteem is particularly dependent on the Physical Attractiveness aspect of body esteem in men, since this subscale shows the strongest correlations with both the SES and PEI. However, Dunn & Clark's Z -score transformations (Steiger, 1980) revealed that this correlation was not significantly stronger than those between the other subscales of Physical Condition and Upper Body Strength and self-esteem as measured by the SES ($Z1^* = .67$, $p = .50$ and $Z1^* = .93$, $p = .35$ respectively) and the PEI ($Z1^* = .00$, $p = 1$ and $Z1^* = .80$, $p = .42$ respectively).

Table 2:

Relationships Between Bodily Attractiveness and Global Self-Esteem

BES Score	SES Score	N	PEI Score	N
Overall	.59 *	273	.65 *	210
Males	.59 *	99	.58 *	64
Physical Attractiveness	.49 *		.48 *	
Physical Condition	.43 *		.48 *	
Upper Body Strength	.38 *		.36 *	
Females	.58 *	174	.65 *	146
Sexual Attractiveness	.46 *		.54 *	
Physical Condition	.39 *		.44 *	
Weight Concern	.52 *		.46 *	

BES = Body Esteem Scale, SES = Self-Esteem Scale, PEI = Personal Evaluation Inventory.

* p < .05

The different measures of global self-esteem seem to produce different results for women. Considering the SES, Weight Concern was most strongly related to self-esteem. A Dunn and Clark's Z-score analysis found that this correlation was significantly stronger than that between scores on the SES and the physical condition subscale of the BES in women ($Z1^* = 2.06, p < .05$) but not the sexual attractiveness subscale ($Z1^* = .95, p = .34$).

In contrast, the PEI correlations suggest that Sexual Attractiveness shows the strongest correlation with global self-esteem in women. However, Dunn and Clark's Z-transformations indicated that this correlation was not significantly stronger than those between the weight concern ($Z1^* = 1.17, p = .24$) and physical condition subscales ($Z1^* = 1.48, p = .14$) and scores on the PEI in women.

Overall, these results suggest that all aspects of bodily esteem show a significant association with global self-esteem, but that physical or sexual attractiveness may be an especially important factor in this relationship.

In addition to assessing the relationship between attractiveness and global self-esteem, analyses were performed to assess its relationship to specific aspects of self-worth. Thus a series of Pearson's product moment correlations were performed between participants' scores on the composite (male and female) face rating scale and the subscales of the PEI. The resulting correlations are shown in Table 3:

Table 3:

Relationships Between Self-Perceived Facial Attractiveness and Domains of Self-Esteem.

PEI Sub-Scale	Facial Attractiveness					
	Overall	N	Males	N	Females	N
Academic	.21*	250	.18	74	.24*	176
Athletic	.22*		.22		.25*	
Appearance	.56*		.40*		.62*	
Romance	.39*		.15		.37*	
Social Interaction	.23*		.21		.25*	
Speaking with People	.12		.10		.13	

PEI = Personal Evaluation Inventory

* $p < .05$

Table 3 indicates that overall, self-rated facial attractiveness is significantly related to all domains of self-esteem except for that of speaking with people. However, only the appearance subscale shows a moderate ($r = .56$) relationship, with the others all falling in the small (.2 to .3) range. In fact, Dunn and Clark's Z score transformations revealed that the relationship between self-

perceived facial attractiveness and scores on the appearance subscale of the PEI were significantly stronger than those between attractiveness and each of the other domains (vs. romance: $Z1^* = 4.60$, $p < .05$; vs. social interaction: $Z1^* = 5.54$, $p < .05$; vs. athletics: $Z1^* = 5.54$, $p < .05$; vs. academic: $Z1^* = 5.98$, $p < .05$; vs. speaking with people: $Z1^* = 7.02$, $p < .05$). This suggests that self-rated facial attractiveness is primarily associated with appearance-related self-esteem and supports Kirkpatrick and Ellis' (2004) theory of the modularity of the sociometer.

Table 3 also suggests that there may be sex differences in the pattern of relationships between self-perceived attractiveness and domains of self-esteem. It can be seen that the relationship between self-perceived attractiveness and appearance-related self-esteem is stronger in females than in males and a Fisher's r to z transformation revealed this difference to be significant ($z = 2.21$, $p < .05$). Similarly, the correlation between self-perceived facial attractiveness and romantic self-esteem is higher in females than in males, although this did not reach significance in the present sample ($z = 1.68$, $p = .09$). It may nonetheless be seen as partial support for sociometer theory given that romantic appeal may be more dependent on facial attractiveness in females as opposed to males.

2.3.3 Relationships Between Global and Dimensions of Self-Esteem

In order to assess the relationship between global self-esteem and specific dimensions of this construct, Pearson product-moment correlations were calculated between participants' scores on the overall SES and sub scales of the PEI. Table 4 displays these statistics together with the sample sizes upon which they are based, for men, women, and both groups together.

Table 4:

Relationships Between Global and Specific Aspects of Self-Esteem.

PEI Sub-Scale	SES Score					
	Overall	N	Males	N	Females	N
Academic	.54*	212	.40*	64	.56*	148
Athletic	.38*		.55*		.25*	
Appearance	.63*		.51*		.67*	
Romance	.54*		.52*		.57*	
Social Interaction	.38*		.57*		.33*	
Speaking with People	.44*		.49*		.38*	

PEI = Personal Evaluation Inventory, SES = Self-Esteem Scale

* $p < .05$

It can be seen that, overall, global self-esteem seems to be most strongly related to participants' evaluations of their physical appearance. In order to test for significant differences between subscale and SES correlations, Dunn and Clark's Z^* scores were calculated between pairs of correlations. These indicated that scores on the appearance subscale showed a significantly higher correlation with global self-esteem than those on the athletic subscale ($Z^* = 3.95, p < .05$), and on the social interaction ($Z^* = 3.85, p < .05$) and speaking with

people ($Z^* = 2.96, p < .05$) subscales. This supports the hypothesis that physical appearance may be an especially important determinant of self-esteem in the present sample.

With respect to sex differences in the relationship between global self-esteem and its dimensions, an inspection of Table 4 indicates that there were different patterns for men and women. For men, global self-esteem seems to be most strongly related to participants' evaluations of their competencies in athletics and social interaction. However, all of the correlations are of the same order of magnitude, and Dunn and Clark's Z transformations indicated no significant differences between subscales with respect to their correlations with global self-esteem. This seems to suggest that global self-esteem in men is approximately equally dependent on their self-perceptions of their competencies in the variety of domains measured by the PEI.

In contrast, female self-esteem seems to be most strongly related to self-perceived physical appearance and competencies in academic and romantic domains. Dunn and Clark's Z transformations indicated that the scores on the appearance subscale of the PEI showed a significantly stronger correlation with global self-esteem than with the athletics ($Z^* = 5.31, p < .05$), social interaction ($Z^* = 4.26, p < .05$) and speaking-with-people subscales ($Z^* = 3.75, p < .05$) for women. Thus female self-esteem seems to be based on a narrower range of components than is the case in males.

Fisher's r to z transformations revealed that the correlation between scores on the athletics subscale of the PEI and global self-esteem was significantly higher in men than women ($z = 2.35, p < .05$) and that this was also true of the correlation between social interaction and global self-esteem ($z = 2.58, p < .05$).

However, none of the other sex differences apparent in Table 3 reached significance.

2.3.4 Specific Physical Predictors of Self-Esteem

In order to further investigate the effects of self-perceived facial and bodily attractiveness on global self-esteem, separate regression analyses were performed for each sex. A forward stepwise multiple regression analysis was used to examine the extent to which men's global self-esteem, as measured by participants' scores on the SES, could be predicted by their self-perceived facial and bodily attractiveness (as measured by the upper body strength, physical attractiveness and physical condition sub-scales of the BES). This analysis produced a model in which physical attractiveness ($\beta=.43$, $p<.05$) and physical condition ($\beta=.28$, $p<.05$) significantly predicted self-esteem, $F(2,72) = 18.75$, $p<.05$, accounting for 32% of the variance. This suggests that male self-esteem may be especially sensitive to self-assessments of overall physical attractiveness and physical condition.

A similar forward stepwise multiple regression analysis was performed for women, using global self-esteem (SES) as the criterion, and facial (facial attractiveness score, facial body esteem) and bodily (sexual attractiveness, physical condition and weight concern sub-scales of the BES) attractiveness as predictor variables. This produced a model in which weight concern ($\beta=.38$, $p<.05$) and sexual attractiveness ($\beta=.30$, $p<.05$) significantly predicted global self-esteem, $F(2,159)=40.78$, $p<.05$, accounting for 33% of the variance. This suggests that women's self-esteem may be especially sensitive to self-evaluations of sexual attractiveness, and concerns over body weight.

2.4 DISCUSSION

The results of Study 1 broadly support the prediction, based on sociometer theory, that self-esteem should be at least partly related to physical attractiveness. The correlations obtained between self-rated facial attractiveness and self-esteem, as measured by both the SES ($r = .39$) and the PEI ($r = .50$), are comparable to those reported in previous studies (Diener et al. 1995; Feingold, 1992; Nell & Ashton, 1996) and so the present study largely supports previous findings on the relationship between self-rated attractiveness and self-esteem.

Indeed the correlations reported here are of a higher magnitude than might be expected given that these are based on the relationship between self-esteem and specifically *facial* attractiveness. Since facial attractiveness only forms one component of overall physical attractiveness, one might expect correlations between this construct and self-esteem to be smaller than those between self-esteem and overall physical attractiveness, which the comparison studies reported here (e.g. Nell & Ashton, 1996) purport to measure. Such issues highlight the importance of adopting a multidimensional approach to the study of attractiveness and self-esteem in order to exactly specify the nature of any discovered relationships.

It is interesting to note that there was a stronger correlation between self-esteem and self-rated facial attractiveness when the PEI, as opposed to the SES, was used to assess the former construct. This might well be due to the nature of the two measures. The PEI is a much longer, multidimensional instrument which is specifically designed to be administered to the target population of undergraduate students and so it contains a number of specific

items which are of particular relevance to this group. In contrast, the SES contains just 10 somewhat general items which may serve as less accurate psychometric instruments in the present context. These issues highlight the importance of using appropriately-tailored instruments and also the utility of incorporating multiple measures of the same variable so that comparisons can be made between the results obtained from each one.

With respect to sex differences in these relationships, the results suggest that there may be a stronger link between self-esteem and self-rated attractiveness in women than in men, but this difference was not significant. It should be noted that the analysis employed; Fisher's r to z transformation, is a relatively conservative technique, and the results of these tests may be prone to type II errors (Zimmerman et al. 2003). Thus, it is possible that in a larger sample the sex differences in the relationship between attractiveness and self-esteem reported here might reach significance. This would accord with the results of Feingold's' (1992) meta-analysis, which found a significantly stronger relationship between these variables in females as opposed to males. This sex difference can be explained from a sociometer perspective, in terms of the relatively greater contribution which physical attractiveness makes to female as opposed to male market value. Sociometer theory suggests that women who consider themselves to be physically unattractive may expect to be unable to secure a mate, and thus may experience consequently lower levels of self-esteem. In contrast men may be less sensitive to their levels of physical attractiveness when considering their desirability and eligibility as a mate (Brase & Guy, 2004).

The present study also found the predicted significant correlation between self-perceived bodily attractiveness, as measured by the BES (Franzoi &

Shields, 1984), and self-esteem as measured by both the SES ($r = .59$) and the PEI ($r = .65$). These results, together with the correlations between the various BES sub-scales and the SES and PEI, accord with previous findings (Franzoi & Shields, 1984; Franzoi & Herzog, 1986; Wade, 2000). With respect to sex differences in these relationships, the results are inconclusive. When the SES was used to measure self-esteem, this construct seemed to be equally related to bodily attractiveness in men ($r = .59$) and women ($r = .58$). However, the relationship between bodily attractiveness and self-esteem as measured by the PEI seemed to be stronger in women ($r = .65$) than in men ($r = .58$), though this difference did not reach statistical significance. This inconsistency between the results obtained from the two different measures of self-esteem might reflect the breadth of items in the PEI, some of which may well be more directly related to bodily attractiveness than are the more general items of the SES. Again, this issue highlights the impact that different measurement instruments can have on the results obtained.

With respect to the relationship between specific aspects of bodily attractiveness and self-esteem, physical and sexual attractiveness seem to relate particularly strongly to self-esteem in both sexes. These results support a sociometer perspective on self-esteem whereby this construct is particularly sensitive to self-assessments of traits which have a direct bearing on market value. In terms of the strength of relationship with self-esteem, bodily attractiveness seems to be followed in importance by physical condition and then upper body strength in males, and by weight concern and then physical condition in females. This pattern of results accords with those of a recent study by Connors and Casey (2006) who found that perceived attractiveness together with weight and shape were significant predictors of self-esteem among women,

whilst perceived attractiveness, strength and fitness predicted male self-esteem. This also agrees with the results of Miller and Downey (1999) who found a stronger negative relationship between heavy weight and self-esteem in women than in men. Thus whilst body size and shape appear to be important predictors of self-esteem in both sexes, it seems that women may be especially concerned with being thin or light, whereas men place a greater emphasis on muscular bulk and thus physical strength. This relationship between muscularity and self-esteem in males may provide further support for the sociometer hypothesis that self-esteem should reflect evolutionary market value (Brase & Guy, 2004). In many species, males compete for access to females in a process of intrasexual competition, and physical size often determines the outcome of these competitive encounters (see Archer, 1988). Consistent with this perspective, Evolutionary Psychologists have demonstrated that physical strength in men positively relates to their self-perceptions of their desirability as mates (Archer & Thanzami, 2009), women consider muscular men to be more attractive (Frederick & Haselton, 2007) and men with higher hand grip strength report having more sexual partners (Gallup, White & Gallup, 2007) Faurie et al. (2004) suggest that physical size and strength may also be important in competitive sports which may represent a ritualised form of intrasexual competition in males. Indeed their study found that male athletes had a significantly higher BMI than non-athletes and also reported having more sexual partners. This supports the contention, based on sociometer theory, that muscularity may be important for male self-esteem as it may help in intrasexual competition for mates.

The relationship between weight concern and self-esteem in women may also be explicable in terms of market value. As discussed above, relative

weight, as measured by BMI, predicts both attractiveness (Cornelissen et al, 2009; Tovée et al, 2002) and fertility (Yilmaz et al, 2009) in females. This link between body weight and attractiveness would explain the corresponding relationship between weight concern and self-esteem, if this latter construct is indeed based on market value, as sociometer theory suggests.

Interestingly, the relationship between BMI and attractiveness has been shown to vary between cultures in line with evolutionary predictions (Tovée, Swami, Furnham & Mangalparsad, 2006). Tovée et al (2002) have calculated that the optimal balance between health and fertility for BMI in western cultures is between 19 and 20, which also corresponds to participants' preferences for attractiveness. However, studies have suggested that individuals in more resource-poor, economically-deprived societies, such as Zulu South Africa, tend to prefer relatively higher BMIs (Tovée et al, 2006). It is suggested that in such societies relatively high body weight may be considered to be indicative of desirable social (e.g. wealth, femininity) and physical (e.g. sexual capacity, physical health) characteristics. For example, HIV/Aids is a major cause of mortality in South Africa, and one of the symptoms of these diseases is a severe loss of body weight (see Macallan, 1999). Thus, a preference for relatively heavy individuals in South African Zulus might reflect an adaptive preference for disease free partners (Tovée et al, 2006). In contrast, in western societies such as the UK, the prevalence of HIV/Aids is significantly lower and cardiovascular diseases and cancers constitute the major causes of mortality (Griffiths, Rooney & Brock, 2005). A lower BMI has been shown to be associated with lower levels of both cancer (Pischon, Nothlings & Boeing, 2008) and cardiovascular diseases (van Dis, Kromhout, Geleijnse, Boer & Verschuren, 2009). Thus the fact that UK participants tend to prefer a relatively

low BMI, whilst South African Zulus show a preference for higher BMIs might reflect both groups using body weight as a cue to health and thus potential fertility. This assessment would involve evaluating the implications of body weight for health and fertility in the local environment. In the context of the present study, it would be interesting to study the relationship between self-esteem and body weight in non-western societies such as Zulu South Africa. It might be predicted that self-esteem would be related to a relatively high body weight in this sample. This would reflect self-esteem responding to attractiveness, as defined by local preferences, in the way predicted by sociometer theory.

These issues highlight an important point about the evolutionary approach to studying human behaviour. It seems attractiveness varies between cultures in ways predictable from ecological constraints such as resource availability and disease prevalence. Thus, preferences for attractiveness represent the behaviour of cognitive modules (e.g. Barkow et al. 1992) which are designed to assess the desirability of potential partners under the prevailing ecological and social conditions, instead of having an inflexible, general preference for a specific trait (e.g. thinness). This perspective is inherent in studies of how parasite load in local environments affects relative mate preferences across cultures (Gangestad & Buss, 1993; Penton-Voak, Jacobson & Trivers, 2004).

It is likely that self-esteem operates in a similar manner. For example, instead of having a general tendency to respond negatively to being overweight, it is likely that the self-esteem system will assess the implications of this for the individual's market value, based on the prevailing physical and social conditions, before responding accordingly. In the context of western societies such as the UK, being overweight decreases market value in females (Tovée et

al, 2002) and thus leads to a consequent decrease in self-esteem (Miller and Downey, 1999). However, in South African Zulus, being overweight may increase market value (Tovée et al, 2006) and so may be expected to increase self-esteem. Thus the self-esteem system would not be directly sensitive to physical traits, but rather to their implications for market value in the local context.

These issues also highlight the importance of social comparison and social context in the study of both attractiveness and self-esteem. As discussed above, sociometer theory is inherently concerned with social comparison, and this emphasis is reflected in the current study, which used a social comparison measure of facial attractiveness. Interestingly Tovée et al (2006) found that Zulu South Africans who moved to the UK adopted the prevailing preferences for relatively low BMIs found in this culture. This suggests that social context has a significant effect on attractiveness preferences and that these may be acquired or modified through social learning. Thus it seems likely that evolved cognitive modules which are designed to assess the attractiveness of potential partners take the specific preferences of the local culture as templates on which to base judgements.

This social learning perspective has important implications for the relationship between attractiveness and self-esteem. It relates for example, to the notion that thin-ideal media images, by increasing individuals' exposure to a generally unattainable model of attractiveness, may be damaging to individuals' self-esteem (e.g. Grogan, 1999). These media images may be used as input for a cognitive module designed to assimilate local consensus as to what constitutes attractiveness, and may thus lead to distorted, negative self-assessments on this trait.

The suggestion that the sociometer system might be sensitive to sociocultural differences in the perceived desirability of various traits receives support from a recent study by Weisbuch, Sinclair, Skorinko and Eccleston (2009) who showed that even subtle cues to the attitudes and likely evaluations of specific individuals could influence the link between self-perceptions and self-esteem. Women varying in weight attended two testing sessions, one week apart, in which they were required to complete implicit measures of self-esteem. In one experimental condition, the experimenter (who was the same individual for both sessions) wore a tee-shirt expressing positive attitudes towards heavy women. Controlling for initial levels of self-esteem, heavier women in this condition reported significantly higher levels of self-esteem in the second session than did their lighter peers. These results indicate that the sociometer system may implicitly assess the likely attitudes of specific individuals, and mediate the relationship between self-perceptions and self-esteem accordingly. This highlights an important point about sociometer theory: Specific self-perceptions of various traits are likely to influence self-esteem only to the extent that these traits have implications for social acceptance and rejection in specific relationships. The study by Weisbuch et al. (2009) suggests that the system may be sensitive enough to respond functionally even in situations where possible relational partners display attitudes counter to the prevailing local consensus.

It is important to note that the results of Study 1 show that facial attractiveness is not equally related to all dimensions of self-esteem as measured by sub-scales of the PEI. Overall, and in both men and women separately, as might be expected, facial attractiveness was most strongly related to the appearance sub-scale of the PEI ($r = .60, .40$ and $.62$

respectively), further supporting the validity of the measures. Moreover, this relationship was significantly stronger than the relationships between each of the other PEI sub-scales and self-rated facial attractiveness. This supports Kirkpatrick and Ellis' (2004) assertion that the sociometer is a modular system in which each module monitors a specific type of social relationship. Facial attractiveness is likely to be especially important in determining an individual's eligibility for sexual relationships, and this is reflected in the relatively strong overall correlation between self-ratings on this trait and self-reported romantic self-esteem ($r = .30$). It is striking that this relationship was found to be significant in women ($r = .37$) but not in men ($r = .15$). This may reflect the fact that female market value or romantic desirability is especially dependent on physical attractiveness, whereas male desirability is thought to be more related to social traits such as status and access to resources (e.g. Buss, 1989).

The relationship between self-rated facial attractiveness and the speaking with people sub-scale of the PEI was low and non-significant in the present study. This sub-scale measures individuals' perceptions of their abilities as public speakers, and thus is related to a fundamentally different type of social relationship than romantic self-esteem. It seems unlikely that oratorical skills are particularly related to physical attractiveness, so these results further support Kirkpatrick and Ellis' (2004) view that the sociometer consists of several independent modules each monitoring performance and eligibility in a different type of social relationship.

The other (social interaction, athletic and academic) sub-scales of the PEI all showed relatively low overall correlations with facial attractiveness, and the strength of these relationships were similar in men and women. The fact that the relationships were significant in women but not men is most likely to be due

to the greater sample size for the former group rather than reflecting any genuine sex differences.

Including both a unidimensional (SES) and multidimensional (PEI) measure of self-esteem in the present study allowed an examination of how specific domains of self-esteem relate to individuals' overall sense of self-worth. Overall, the attractiveness and romance sub-scales of the PEI showed the strongest correlations with global self-esteem in the current sample. This sample consisted predominantly of undergraduate students, most of whom are relatively young (the mean age of respondents was 23.5) and at an age where reproductive activity is likely to be of particular concern. The nature of the sample was also reflected by the fact that the academic sub-scale of the PEI showed a relatively strong relationship with global self-esteem ($r = .54$). It is likely that samples taken from other demographic groups would show different profiles with respect to the strength of the relationships between global self-esteem and its specific domains. For example, it might be predicted that a sample of post-menopausal women would show lower correlations between romantic and attractiveness self-esteem and global self-esteem, since they would presumably be less concerned with reproductive activities. In fact, demographic differences were evident in the data such that the pattern of relationships between global self-esteem and its sub-components differed between men and women. Self-esteem in men was found to be most strongly related to social interaction and athletic performance, and these correlations were significantly higher than the corresponding relationships in women. Athletic encounters may provide an opportunity for men to display their physical attributes in ritualised intrasexual competitions for mates (e.g. Schulte-Hostedde et al. 2008). This suggestion has been supported by findings which show that

male athletes report having more sexual partners than non-athletes (Faurie, et al. 2004). Thus, athletic ability may be indirectly related to sexual desirability in men and this may explain why athletic self-esteem is more strongly related to global self-worth in men than in women, from a sociometer perspective.

However, it is interesting to note that all of the PEI sub-scales showed correlations with global self-worth of a similar order of magnitude (r between .40 and .58) in men and there were no significant differences between these relationships. This suggests that the self-esteem of male undergraduate students is likely to be roughly equally dependent on a variety of domains of competence. The profile for women, however, was somewhat different. Female global self-worth was found to be most strongly related to appearance self-esteem and this relationship was significantly stronger than those between the former variable and the athletics, social interaction and speaking with people sub-scales of the PEI. Thus, appearance appears to be an especially important determinant of self-esteem in female undergraduates. This accords with the findings on facial and bodily attractiveness reported above and lends further support to the sociometer theory of self-esteem.

It seems likely that such demographic differences interact with the hypothesised modular structure of the sociometer (Kirkpatrick & Ellis, 2004) reflecting the fact that different types of social relationship may be more or less important to different groups of individuals. This would resonate with more general approaches to self-esteem, which stress that different domains of self-worth will be more or less valued by different individuals, and thus contribute differentially to global self-worth (e.g. Crocker & Wolfe, 2001; Pelham & Swann, 1989).

Taken as a whole, the results of Study 1 support previous research in providing evidence for a positive relationship between self-perceived physical attractiveness and self-esteem. The study added to the wealth of previous evidence suggesting that there is a positive relationship between self-perceived attractiveness and self-esteem (e.g. Feingold, 1992). These results are consistent with an interpretation based on sociometer theory, which would suggest that physical attractiveness is likely to increase both the quality and quantity of an individual's interpersonal relationships and also their eligibility for such relationships. This should lead to a positive evaluation by the sociometer and thus high self-esteem. Therefore, sociometer theory suggests that high self-perceived attractiveness at least partially causes high self-esteem in individuals.

However, an alternative explanation is possible, namely that individuals' perceptions of their own attractiveness are in fact a result of their pre-existing levels of self-esteem. This interpretation would suggest that individuals who have high self-esteem tend to perceive themselves as being more attractive. Conversely individuals with low levels of self-esteem may consequently perceive themselves as being less attractive.

Studies 2 to 4 were designed to test these alternate hypotheses using experimental designs. Studies 2 and 3 attempted to manipulate participants' self-perceived attractiveness to examine whether this affected their levels of self-esteem. Evidence that this was the case would suggest that self-perceived attractiveness exerts a causal influence on self-esteem and would thus provide support for sociometer theory. Conversely, Study 4 attempted to manipulate participants' self-esteem to see whether this affected their levels of self-perceived attractiveness. If this were the case, it would support the hypothesis that levels of self-esteem exert a causal influence on self-perceptions of

attractiveness, and would not support the assumptions on which sociometer theory rests.

CHAPTER 3

STUDY 2: DOES MANIPULATING SELF-PERCEPTIONS OF ATTRACTIVENESS AFFECT SELF-ESTEEM?

3.1.1 Manipulations of Social Inclusion Affect Self-Esteem

Sociometer theory (Leary et al, 1995; Leary & Baumeister, 2000) suggests that self-esteem functions to monitor the quality and quantity of an individual's interpersonal relationships. Thus, self-esteem is especially sensitive to social inclusion or exclusion such that individuals who perceive themselves to be included in social groups have higher levels of self-worth. In contrast, events which involve rejection from social relationships, such as romantic rejection, expulsion from family or social groups, unemployment and abandonment tend to be accompanied by losses in self-esteem (Leary & Baumeister, 2000). It follows from this that any experimental manipulations which serve to increase or decrease an individual's perceptions of his or her level of social inclusion should have a consequent effect on his or her level of self-esteem. A number of studies have shown that such manipulations do indeed have an effect on self-esteem. In the first such study (Leary et al. 1995, study 3) social inclusion was manipulated by informing participants that they were either included or excluded from a laboratory work group. Furthermore, participants were informed that their inclusionary status was either random or based on the preferences of other group members. Having completed brief questionnaires asking them to rate themselves on a number of traits (e.g. open-closed, athletic-non athletic) and having written short essays on their actual and ideal identities, participants were informed that they would be required to complete an experimental task. Half of the participants were told that they were to complete the task as part of a group.

Of these, half were informed that they had been selected by other group members on the basis of their questionnaire responses and essays (social inclusion) whilst the remainder were informed that they had been randomly allocated to groups (random inclusion). The remaining participants were informed that they would be working alone. Of these, half were informed that this allocation was based on their earlier responses (social exclusion) and half were informed that the allocation was random (random exclusion). Following this, participants were asked to report how they currently felt about themselves using adjective rating scales taken from McFarland and Ross' (1982) self-esteem factors and so their levels of state self-esteem were measured. The results showed a significant effect of inclusion on levels of state self-esteem, but only when this was based on participants' questionnaires and essays. Thus, participants who were socially included showed the highest levels of self-esteem. Levels of self-esteem in these participants were slightly higher than those of all participants in the random conditions, which did not differ between the included and excluded groups. However, levels of self-esteem were significantly lower in the socially excluded group. These findings were replicated and extended in study 4 (Leary et al, 1995), where participants were required to talk through a microphone on a variety of topics, ostensibly to another participant of the opposite sex. Participants who were informed that this individual liked, accepted and wanted to interact with them subsequently reported higher levels of state self-esteem than those who were informed that they were not particularly liked or accepted, and that the other participant did not want to interact with them. A similar study was conducted by Leary et al. (1998; study 4). Participants were asked to answer a number of questions about their personality and opinions and their responses were recorded and ostensibly

played to another participant. They were then given feedback, in the form of recorded speech from this individual which was ostensibly their impressions of the participant. In fact the speech consisted of stimulus material constructed by the experimenters, and it included a number of positive (e.g. clever, humorous) and negative (e.g. dull, arrogant) adjectives. Throughout this feedback, participants indicated how positive they currently felt about themselves in real time using a mouse to control an on-screen cursor. The results supported earlier research by showing that participants' feelings about themselves closely corresponded to the feedback they were receiving. Thus they tended to feel positive about themselves whilst receiving positive feedback, and negative whilst hearing negative adjectives.

These results indicate that participants' levels of self-esteem can be manipulated by providing them with feedback which is relevant to social inclusion or exclusion. Participants who believe that they have been rejected, on the basis of others' evaluations of their personal qualities, experience consequent drops in self-esteem, as would be predicted by sociometer theory. Interestingly, participants who believed themselves to be socially included did not report significantly higher levels of self-esteem than those who had been randomly allocated to groups. These findings suggest that the sociometer may be more sensitive to social rejection than acceptance.

These effects seem to be so robust that they can be obtained even when participants are simply required to imagine being socially accepted or rejected. Leary et al. (1998; study 1) asked undergraduate participants to imagine being given a personal evaluation by one of their professors. Different groups of participants then received imaginary evaluations, ranging from very positive to very negative. Participants who had received very positive imaginary

evaluations reported having higher levels of state self-esteem than those receiving negative evaluations. Results from study 2 by Leary et al. (1998) supported these findings. Participants were asked to imagine being given feedback from a partner in a hypothetical blind date. The feedback consisted of the partner indicating how much social interaction they would like to have with the participant on the basis of the date. Participants who were given feedback indicating that their imaginary partner would like to interact the most with them reported having higher levels of state self-esteem than those who had been given feedback indicating that the partner would not want to interact with them.

Nezlek, Kowalski, Leary, Blevins and Holgate (1997) replicated and extended the earlier findings of Leary et al (1995; study 3) on the effects of social inclusion on self-esteem by using the same paradigm to examine individual differences in reaction to rejection. This study confirmed the earlier findings that social exclusion causes subsequent decreases in self-esteem and also suggested that depressed individuals may be especially sensitive to social inclusion or exclusion (study 1). Furthermore the results of study 2 by Nezlek et al (1997) suggested that individuals with low levels of trait self-esteem, as measured by the Rosenberg (1965) SES, similarly showed a greater sensitivity to inclusion or exclusion than those with higher trait self-esteem. Specifically, individuals with low trait self-esteem seem to be especially sensitive to social rejection.

Of particular relevance to the current work, recently, Kavanagh et al. (2010) conducted a study on the effects of social acceptance or rejection on self-esteem in a study which was ostensibly concerned with people's perceptions of potential dating partners. Participants who were not currently engaged in relationships responded to questions posed by attractive members of the

opposite sex who were in fact confederates in the study. They were then provided with false feedback indicating whether these individuals would be interested in meeting up with and dating them. Participants who received positive (accepting) feedback showed increases in self-esteem compared with their pre-test scores on this, and also higher levels of self-esteem than those who received negative (rejecting) feedback, who experienced decrements in self-esteem compared to their pre-test scores.

Taken together, these studies strongly suggest that experimental manipulations of participants' levels of social inclusion or exclusion and acceptance or rejection affect their levels of self-esteem in a manner consistent with sociometer theory. However, as stated above, this theory suggests that the sociometer should not only be sensitive to an individual's actual social relationships (i.e. acceptance), but should also respond to their perceptions of their eligibility for such relationships. It follows from this that any experimental manipulations which affect self-perceptions of traits which are relevant to this eligibility should have a consequent effect on self-esteem. Thus sociometer theory predicts that increasing or decreasing an individual's self-perceived desirability should also increase or decrease their self-esteem.

Given that physical attractiveness forms an important component of relational desirability, particularly in romantic and sexual relationships, it follows that manipulating individuals' self-perceptions of this should affect their subsequent levels of self-esteem. To date, there have been very few studies which have addressed this prediction (see Pass et al. 2010, for a recent exception). In order to address this limitation in the literature, the current Study 2 represented an attempt to manipulate participants' self-perceived physical attractiveness to examine whether this affected their levels of self-esteem.

3.1.2 Manipulating Self-Perceived Attractiveness

Several modern approaches to the study of physical attractiveness highlight the fact that attractiveness judgements are likely to be affected by a process of social comparison. One of the first studies to investigate this looked at male and female undergraduates' assessments of the attractiveness of average-looking women presented in the context of images of either very attractive or very unattractive women (Melamed & Moss, 1975). A contrast effect was observed, whereby participants provided higher attractiveness ratings for the targets when they were presented together with unattractive as opposed to attractive images. These results were extended in a study which examined contrast effects on male undergraduates' judgements of the attractiveness of female targets (Kenrick & Gutierrez, 1980). In this study, men who were exposed to images of highly attractive women, both in a natural setting (after viewing the television show "Charlie's Angels") and in the laboratory, subsequently rated target women as being less attractive than did subjects who had not been exposed to such images. These studies demonstrate that individuals' judgements of the attractiveness of others are affected by contrast effects involving other recently or concurrently viewed images. This suggested the possibility that individuals' self-perceptions might also be based on such social comparisons.

Several studies have now demonstrated that this is indeed the case, such that individuals' self-perceptions can be manipulated by exposing them to comparison images. This approach is most often used in studies of how exposure to thin-ideal media images may have a negative impact on individuals' perceptions of their own body image (see Groesz, Levine & Murnen, 2002 and Want, 2009 for meta-analytic reviews). However the first study to show an effect

of social comparison on individuals' self-perceived attractiveness was conducted by Cash, Cash and Butters (1983). Female participants in this study were divided into three groups, each of which was presented with a different booklet containing images of women taken from magazine articles. Each image had been previously rated for attractiveness by four independent judges. Participants in the "not attractive" condition viewed images which had been deemed to be of below average attractiveness. In the "attractive" condition, the images used had been deemed to be of above average attractiveness, and the same pictures were also used in the "professionally attractive" condition, in which an advertiser's name (e.g. "Calvin Klein") was attached to each image. Participants engaged in a filler task which involved rating the presented images on various traits, and were subsequently asked to indicate their own level of self-perceived attractiveness on a 10-point scale, and also to complete a measure of body satisfaction, ostensibly as part of an unrelated study. The results showed a significant contrast effect, whereby participants in the "attractive" condition rated themselves as significantly less attractive than those in the "unattractive" condition. Interestingly, participants in the "attractive" condition also rated themselves as being significantly less attractive than those in the "professionally attractive" condition, despite the fact that the same images were used in both cases. The authors explain this finding by drawing on Festinger's (1954) general theory of social comparison to suggest that individuals may only compare themselves to people whom they consider to be within their immediate social group. From an evolutionary and sociometer perspective it may be the case that individuals are likely to be making social comparisons on attractiveness to assess their chances of securing a mate in

intrasexual competitions. Such competition is only likely to occur within peer groups and this may help to explain this latter finding of Cash et al. (1983).

These competition effects within social comparisons of attractiveness were further examined by Brown, Novick, Lord and Richards (1992). In their first study, they found that female undergraduate students who were shown a photograph of an unattractive woman rated themselves as significantly more attractive than those who had been shown a picture of an attractive woman. Interestingly, no such contrast effect was observed when participants were shown pictures of attractive or unattractive men. This suggests that individuals only compare their attractiveness to same-sex individuals and this supports the view that these social comparisons may be used by people to assess their competitiveness in intrasexual competition for mates.

However, the second and third studies by Brown et al. (1992) demonstrated that there may be limitations to the extent to which individuals compare themselves with same-sex peers. Specifically, they failed to find evidence for a contrast effect on self-perceived physical attractiveness when they induced a high degree of psychological closeness between the participant and the target. Closeness was operationalised by a close similarity in attitudes, opinions and interests (study 2), and sharing a date of birth (study 3). Thus when participants believed themselves to share attitudinal traits or a birthday with a comparison female, their attractiveness judgements showed a reverse contrast effect: These participants actually rated their own attractiveness as slightly higher having seen an attractive as opposed to an unattractive female whom they believed to be attitudinally similar to themselves. On the face of it, these results would seem to conflict with the intrasexual competition perspective outlined above. It may be possible to explain these results, however, in more general

terms related to self-esteem maintenance. Tesser's (1988) self-esteem maintenance model (SEMM) suggests that the achievements and positive evaluation of close others can lead people to enhance their perceptions of their own self-worth. This accords with sociometer theory in that close associations with other valued individuals are likely to enhance individuals' perceptions of the quality of their interpersonal relationships, and perhaps more importantly, their eligibility for such relationships. This may result from the fact that this eligibility is also likely to be increased from the perspective of third party individuals: Essentially, being associated with valued individuals is likely to make people more highly regarded by others (this might be termed the "reflected glory" effect). Evidence for this view comes from a study by Sigall and Landy (1973) which showed that men who were romantically linked with attractive women were more positively evaluated than those who were attached to unattractive women (anecdotally the "trophy wife" effect). These association effects may well be strong enough to overcome an intrasexual competition effect of attractiveness comparisons.

The fourth study by Brown et al. (1992) sought to further investigate whether self-esteem maintenance and enhancement processes affected social comparisons with similar or dissimilar others. This study was based on the suggestion by Brown, Collins and Schmidt (1988) that individuals with high self-esteem tend to use different self-enhancement strategies than those with low feelings of self-worth. Specifically, they found that individuals with high trait self-esteem tended to pursue self-enhancement strategies that relied on themselves, whereas those with low self-esteem tended towards strategies which involved their relationships with others (e.g. reflected glory). Brown et al. (1992, study 4) split participants into high and low self-esteem groups, on the

basis of their scores on the Texas Social Behavior Inventory (Helmreich & Stapp, 1974), a measure of trait self-esteem which focuses on social aspects of the trait. They found evidence for a reverse contrast effect in low self-esteem participants who were asked to compare themselves with targets with whom they shared a birthday, whereby attractive targets evoked higher self-ratings of attractiveness than did unattractive targets. This was not the case for high self-esteem participants, who showed a normal contrast effect in their self-ratings. This pattern of results suggests that contrast effects may well be mediated by SEMM processes, as described above.

Brown et al. (1992, study 4) were the first to investigate how social comparison effects on self-rated attractiveness influence self-esteem and so this study is of particular relevance to the present research. Their study revealed an interaction contrast effect between target attractiveness and similarity on participants' subsequent level of self-esteem, as measured by the TSBI (Helmreich & Stapp, 1974). Specifically, where targets were dissimilar to participants, a contrast effect was observed whereby participants who were exposed to attractive targets subsequently reported significantly lower levels of self-esteem than those who had been shown unattractive pictures. This finding can be interpreted as showing support for sociometer theory, by demonstrating that manipulating participants' self-perceived attractiveness by use of social comparison has a resulting effect on their levels of self-worth, as predicted above. Interestingly, a reverse contrast effect of target attractiveness on self-esteem was found when similarity was induced between participants and targets. This may also show support for a sociometer theory whereby participants who identify with attractive others show a resulting increase in self-

esteem, perhaps because this identification serves to increase their sense of eligibility for social relationships.

To date, only two other published studies have examined the effects of attractiveness comparisons on self-esteem (Kowner & Ogawa, 1993; Thornton & Moore, 1993). These studies are also noteworthy since they were the first to investigate whether social comparison effects on self-perceived attractiveness occur in men as well as women. In their first study, Thornton and Moore (1993) asked male and female undergraduate students to indicate their levels of physical attractiveness on a 24-item questionnaire which contained items such as "I am a physically attractive person" and "I have attractive facial features". Participants were also required to fill in the Rosenberg (1965) SES measure of global trait self-esteem together with a Self-Consciousness Scale (Fenigstein, Scheier & Buss, 1975). Half of the participants did this in a manipulation condition, where there was a poster board with pictures of highly attractive same-sex individuals clearly visible at the front of the testing room. The other participants were assigned to a control condition where no such pictures were present. The results showed a clear contrast effect whereby both male and female participants in the manipulation condition rated themselves as being significantly less attractive than those in the control condition. Although overall, women reported lower levels of self-rated attractiveness than men, there was no evidence for an interaction between sex and condition, suggesting that physical attractiveness contrast effects are similar in strength in men and women. However, whilst participants in the manipulation condition showed higher levels of public self-consciousness and social anxiety, there appeared to be no significant contrast effect on global trait self-esteem. The authors attributed this to the fact that global self-esteem may be relatively insensitive to

manipulations of self-perceived attractiveness. To address this, in their second and third studies Thornton and Moore (1993) investigated whether attractiveness contrast effects would affect a more specific measure of social self-esteem, the TSBI (Helmreich & Stapp, 1974). These studies found evidence that this was indeed the case. Participants of both sexes exposed to highly attractive same-sex individuals subsequently reported lower levels of trait social self-esteem relative to controls. Additionally, study four showed that participants who were shown highly unattractive pictures of same-sex individuals reported higher subsequent levels of social self-esteem than controls. These findings strongly support sociometer theory by suggesting that manipulating participants' self-perceived attractiveness has a knock-on effect on their self-esteem. Thus, the present Study 2 sought to replicate and extend the findings of Brown et al. (1992, study 4) and Thornton and Moore (1993).

3.1.3 Media Effects on Body Image

In addition to the studies reported above, a growing number of studies examining the effects of exposure to thin-ideal, highly attractive media images on the body image of women have been conducted (see Want, 2009 for a recent review). These studies typically expose female participants to advertising images depicting either thin and highly attractive women, or neutral products, and then examine whether this exposure affects their subsequent levels of self-reported attractiveness, body image and esteem, and appearance self-esteem. In a meta-analysis of 75 such published studies, Want (2009) reported a significant, small to medium overall weighted-mean effect size ($d = -.35$) of exposing female participants to ideal images on their appearance satisfaction.

Thus, these studies provide further evidence for physical attractiveness contrast effects. However, they are limited in the extent to which they can be used to assess the specific predictions of sociometer theory.

First, these studies do not examine whether attractiveness contrast effects affect global self-esteem in addition to specific, attractiveness-based, aspects of self-worth. Sociometer theory predicts that any process which affects self-perceptions of attractiveness should have subsequent effects on both appearance-based and global self-esteem (though the latter to a possibly lesser extent, given that relational desirability is influenced by other variables, in addition to physical attractiveness).

Second, from a sociometer perspective, it is not clear whether thin-ideal models represent a relevant source of social comparison information for the majority of women. As discussed above, from a sociometer perspective, the widely demonstrated correlation between self-perceived attractiveness and self-esteem in women (Feingold, 1992 and see Study 1, above) is thought to reflect the relationship between female market value (i.e. relational desirability as a romantic or sexual partner), and feelings of self-worth. However, the concept of market value is inherently relative, and reflects an individual's desirability as a partner in comparison to same-sex competitors in the relevant *mating market* (the local context in which mate choice decisions are made: Pawlowski & Dunbar, 1999). Thus, from an evolutionary perspective, individuals should be especially concerned with comparing their desirability to individuals whom they see as likely competitors for mates (e.g. those who are similar to themselves in terms of age, social status, occupation and background etc), and sociometer theory predicts that self-esteem should be sensitive to such comparisons. In the present context, it seems highly unlikely that women will perceive thin-ideal

models as potential intrasexual competitors. Instead it seems likely that most women are aware that these individuals are exceedingly rare and do not tend to compete in similar mating markets to themselves and so their attractiveness relative to these individuals should have comparatively little impact on their self-perceived market value and subsequent self-esteem. It is therefore unclear how far research on comparisons with thin-ideal media images can address hypotheses derived from sociometer theory. For this reason, the present study exposed women to images of highly attractive or unattractive “ordinary” women (whom participants are expected to perceive as realistically indicative of potential competitors in the mating market) to assess whether these affect participants’ levels of self-perceived attractiveness and self-esteem.

3.1.4 Limitations of Previous Research

Whilst the studies (Brown et al. 1992, study 4; Thornton and Moore, 1993) reported above suggest that self-esteem can be affected by manipulating participants’ self-perceived attractiveness, they have important limitations relating to their approaches to measuring the former construct. The TSBI (Helmreich & Stapp, 1974), which was used in both of these studies, is a measure of trait self-esteem and is designed to measure stable perceptions of self-worth over time. Thus these studies differ from those investigating the effects of experimentally-manipulated social inclusion reported above, which typically use state measures of self-esteem, designed to measure feelings of self-worth at that particular moment. From a theoretical standpoint, state measures of self-esteem should be more sensitive to experimental manipulation than trait measures, which by definition would not be expected to fluctuate in

response to transient changes in self-evaluations. The fact that previous studies (Brown et al. 1992, study 4; Thornton and Moore, 1993) have found a physical attractiveness contrast effect on trait self-esteem might suggest that a similar effect could be demonstrated for state self-esteem. This would follow from a theoretical perspective suggesting that trait self-esteem merely reflects aggregate levels of state self-esteem over the long term (see Wells & Marwell, 1976). However, Leary and Baumeister (2000) suggest that this may not be the case. Their treatment of sociometer theory argues that state self-esteem is concerned with temporary appraisals of relationship status and thus responds immediately to social acceptance and rejection, as has been demonstrated in the studies discussed above (Leary et al, 1995; 1997). In contrast, trait self-esteem is thought to reflect an individual's self-assessment of their eligibility for future social relationships (Leary & Baumeister, 2000). Thus, there may be situations in which there is a poor correspondence between state and trait self-esteem. In the case of attractiveness contrast effects, these do not involve acceptance or rejection, but instead seem likely to affect individuals' assessments of their eligibility for social and especially sexual relationships. Thus from a sociometer perspective, these manipulations are likely to affect trait self-esteem (Brown et al. 1992, study 4; Thornton and Moore, 1993) but not state self-esteem. To date, the only study examining physical attractiveness contrast effects on state self-esteem has provided inconclusive results. Kowner and Ogawa (1993) exposed Japanese undergraduate students to images of highly or moderately attractive, or unattractive, Japanese students or Caucasian models and measured their subsequent level of state self-esteem. The only significant attractiveness contrast effect on state self-esteem was observed in women exposed to Caucasian targets. Asian targets did not produce a contrast

effect on self-esteem in women, and men did not demonstrate any contrast effects. However, to date, no studies have examined physical attractiveness contrast effects on state self-esteem in a Western sample.

Thus, one of the objectives of the present study is to include both trait (PEI; Shrauger & Schohn, 1995) and state (Heatherton & Polivy, 1991) measures of self-esteem. If trait-, but not state-, self-esteem is affected by attractiveness contrast effects, this would support a sociometer perspective on the distinction between these constructs (Leary & Baumeister, 2000). If, on the other hand, both state- and trait- self-esteem are affected by physical attractiveness contrast effects, this would support a more traditional treatment of this distinction (Wells & Marwell, 1976).

The other principal limitation of the studies demonstrating an effect of attractiveness contrast on self-esteem described above (Brown et al. 1992, study 4; Thornton and Moore, 1993) is that they both use a relatively unidimensional measure of the latter construct. The TSBI (Helmreich & Stapp, 1974) seeks to measure self-perceived social competence, and includes items such as “I would describe myself as self-confident” and “I feel secure in social situations”. However, it is a unidimensional measure and so does not distinguish between different types social relationship. Moreover, it only includes one item pertaining to attractiveness (“I feel confident of my appearance”). It seems intuitively likely that attractiveness contrast effects will have differential effects on self-confidence in various types of social relationships or encounters. The present study seeks to address this issue by using the multidimensional measure of trait self-esteem used in the current Study 1; the PEI (Shrauger & Schohn, 1995).

Thus Study 2 involved exposing female participants to images of either highly attractive, or unattractive, women, and measuring their subsequent levels of self-esteem using a variety of measures. Given that the relationship between self-perceived attractiveness and self-esteem is stronger in women than in men (Feingold, 1992 and see Study 1), and that comparatively few studies have demonstrated physical attractiveness contrast effects in men, it was decided to focus on women in the present study. It was predicted that manipulating self-perceived attractiveness would have the strongest effect on participants' scores on the appearance sub-scale of the PEI, since this is designed to explicitly measure this construct. It was also predicted that the manipulation should strongly affect romantic self-esteem, given that self-perceived eligibility for romantic relationships is likely to be especially related to physical attractiveness, particularly in women (Buss, 1989). In contrast, it seems likely that other aspects of social self-esteem, as measured by the social interaction and speaking with people subscales of the PEI, should be only weakly affected by an attractiveness contrast effect. It seems unlikely that academic and athletic self-esteem will be subject to an attractiveness contrast effect, given that physical attractiveness is unlikely to be an important asset in these domains and so no significant contrast effects on these variables were predicted.

3. 2 METHOD

3.2.1 Design

Female participants were randomly allocated to one of two conditions which exposed them to pictures of either highly attractive or unattractive others and were then asked to report their levels of state and trait self-esteem.

3.2.2 Participants

Female participants were recruited by distributing flyers to undergraduate students at the University of Central Lancashire and by emailing a link to the study web-site to a university-wide mailing list. The flyers invited them to take part in a brief study on personality and attitudes towards attractiveness and provided the web address of the study. In addition, participants were asked to forward details of the study to any other women they knew who might be willing to take part. In total, 137 women took part in the study and their ages ranged from 18 to 57 years (mean = 29.9, SD = 11.5).

Participants were randomly allocated to experimental conditions by the test server. This resulted in 64 individuals participating in the attractive comparison condition, with 73 allocated to the unattractive group.

Response sets were examined to ascertain whether they were received from computers with duplicate ID numbers, since this might indicate multiple responding by the same participants. However there were no duplicate numbers in the received data.

The design of the experiment allowed participants to complete some parts of the test without finishing the experiment as a whole and some participants had missing data for some of the scales used. Participants with any missing data for a particular scale were excluded from analyses of that scale. This meant that different sample numbers were obtained for each part of the test. Therefore separate sample numbers are reported for each of the statistical analyses conducted and described below.

3.2.3 Materials

3.2.3.1 Attractiveness Manipulation

The stimuli used to attempt to manipulate participants' levels of self-perceived attractiveness were constructed in a similar fashion to those used by Wilson and Daly (2004) and Little and Mannion (2006). Pictures of 20 attractive ("Hot") and twenty unattractive ("Not") females were downloaded from a freely accessible online database (www.hotornot.com). On this site visitors are asked to rate a number of photographs of women which have been uploaded by users. The ratings range from 1 (*not attractive*) to 10 (*very attractive*) and the mean score, together with the number of raters is displayed next to each picture. For the present study, and following Little and Mannion (2006), hot stimuli were selected from those pictures with a mean rating of greater than nine (mean = 9.6), and not stimuli were created from those with a mean rating of less than six (mean = 5.2). The pictures selected as stimuli were designed to clearly display the faces of individuals, and some also included their bodies, although pictures which showed individuals in a state of partial undress (e.g. swim-wear,

commonly found in the hot pictures) were excluded. Pictures were selected from the 18-25 and 26-32 age groups on the website, since these categories most closely reflected the age of the majority of participants in the present study. All of the stimuli selected had each been rated by more than 100 individuals (mean = 257). Using stimuli constructed in this way, Wilson and Daly (2004) manipulated the extent to which men discounted future rewards, and Little and Mannion (2006) showed that women's self-perceived attractiveness and preferences for male faces could be manipulated. These studies suggested that this method was likely to be a valid manipulation of self-perceived attractiveness in the present sample.

3.2.3.2 *State Self-Esteem*

State self-esteem was measured using the widely used State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991). The scale consists of twenty items consisting of statements designed to measure individuals' current or momentary levels of self-esteem in three domains including Performance (e.g. "I feel confident about my abilities"), Appearance ("I feel satisfied with the way my body looks right now"), and Social ("I feel concerned about the impression I am making"), which were identified through factor analysis. Participants are instructed to respond to items based on how they are feeling at that particular moment, and rate each statement on a five-point scale ranging from 1 (*not at all*) through 3 (*somewhat*) to 5 (*extremely*). The scale shows a high degree of internal consistency ($\alpha = .92$; Heatherton & Polivy, 1991), and strong correlations with other measures of self-esteem such as the Rosenberg (1965)

SES ($r = .72$) suggesting that it is a reliable and valid measure of state self-esteem.

3.2.3.3 Trait Self-Esteem

Trait self-esteem was measured using the 54-item Personal Evaluation Inventory (PEI; Shrauger & Schohn, 1995) used in Study 1 and described in detail in Section 2.2.2.3.

3.2.4 Procedure

When participants entered the web address for the study, the test server randomly loaded either the attractive (hot) or unattractive (not) version of the form, thus randomly assigning participants to either condition. These were identical in every respect except for the photographs displayed in the attractiveness rating part of the test (see below). The first page of the form contained brief instructions initially thanking participants for agreeing to take part in the study. The instructions explained that participants would be required to rate the attractiveness of a number of individuals of the same sex, and then answer some questions about various aspects of their own personalities. They then went on to explain that participants' responses would be treated strictly anonymously and confidentially, and that they should not answer any questions with which they were uncomfortable. Participants were informed that they could withdraw from the study at any time without penalty. They were then asked to fill in boxes indicating their age and sex before pressing a "next page" button which took them to the instructions for the face rating part of the study. Any

participants who reported being male were excluded from the study. The instructions informed participants that they were about to see a series of pictures of women and that they should rate the attractiveness of these individuals on the scales provided. As soon as they rated each picture the next one would be displayed. Participants started rating by pressing the “next page” button. Participants in the attractive condition rated hot pictures, whilst those in the unattractive condition rated *not* photos. The order in which the pictures were presented was randomised for each participant. Each photo was presented on a separate page above a rating scale ranging from 1 (*Very unattractive*) to 7 (*Very attractive*) and participants clicked on the appropriate box on the scale to indicate their response. As soon as participants responded, the next image was displayed. When participants had rated all twenty pictures, they were taken to the instruction page for the State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991), which instructed participants that the questionnaire was designed to measure what participants were thinking at that moment. Participants were informed that there was no right or wrong answer, and that the best answer was what they felt was true of themselves at that moment. They were asked to answer questions as they were true for them “RIGHT NOW”. Participants proceeded to the SSES questions by pressing the “next page” button. The questions were presented in four pages containing five items each. Participants indicated their level of agreement with each statement by clicking on the most relevant box on the five-point scale. When they had finished completing the SSES, participants were directed to the first page of the PEI (Shrauger & Schohn, 1995) which contained instructions for completing the scale. They stated that the following pages contained a number of statements that reflect common feelings, attitudes and behaviours. Participants were asked to read

each statement carefully, think about whether they agreed or disagreed that it applied to them, and select the appropriate response. They were asked to try to respond honestly and accurately, but were informed that it was not necessary to spend much time deliberating about each item. They were instructed to think about how the item applied to them during the past two months unless some other time period was specified. They then proceeded to complete the measure by selecting the appropriate response on the four-point scale provided. When the participant had completed the PEI, they were taken to a debrief page which thanked them for participating and informed them that they could receive feedback on the aims and findings of the study by contacting the researcher at a provided email address. They were informed that if they had particular concerns about the issues raised by the study, they could contact the university counselling service. Participants were also informed that the researcher was conducting a follow up study (Study 4) investigating reaction times and attractiveness and asked to input their email address if they might be interested in taking part. Participants then submitted their data by pressing a button labelled "Submit Data". This sent participants' responses back to the server where they were collated for subsequent analysis.

3.3 RESULTS

3.3.1 *Attractiveness Ratings of Stimuli*

Participants' ratings of the hot and *not* stimuli were compared using a two-tailed independent samples t-test. This showed that ratings of attractiveness were significantly higher for the hot (mean = 4.41, SD = .54) pictures than the *not* (mean = 4.04, SD = .93) pictures ($t(114) = 2.58, p < .05$). This suggests that the hot pictures were perceived as being significantly more attractive than the *not* pictures, although it should be noted that this difference is small relative to the range of the 7-point scale employed.

3.3.2 *Trait Self-Esteem*

Table 5 shows mean overall and subscale scores for the Personal Evaluation Inventory measure of trait self-esteem for participants in each experimental condition, together with the results of two-tailed independent samples t-tests comparing means between conditions, and effect size estimates for these.

Table 5:

Effects of Exposure to Different Levels of Attractiveness on Trait Self-Esteem

Personal Evaluation Inventory Scale	Condition Mean (S.D.)		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Hot	Not				
Total	2.64 (.43)	2.67 (.38)	-0.46	115	.65	.08
Appearance	2.50 (.61)	2.61 (.51)	-0.99	115	.32	.18
Romantic	2.71 (.65)	2.69 (.64)	.16	115	.88	-.03
Social	2.79 (.54)	2.91 (.63)	-1.12	114	.27	.21
Speaking with People	2.72 (.82)	2.66 (.86)	.41	114	.68	-.08
Academic	2.74 (.56)	2.77 (.57)	-.31	108	.76	.06
Mood	2.62 (.56)	2.64 (.46)	-.22	115	.83	.04
General	2.55 (.56)	2.62 (.58)	-.63	115	.53	.12

Table 5 shows that for the overall PEI scale, together with the Appearance, Social, Academic, Mood and General subscales, participants in the *not* condition reported slightly higher levels of self-esteem than those allocated to

the hot condition. In contrast, participants in the hot condition reported slightly higher levels of self-esteem in the areas of Romance and Speaking with people. A series of two-tailed independent samples t-tests indicated no significant differences between the experimental (hot vs. not) groups on any of the PEI scales at the 5% alpha level. Cohen's *d* (Cohen, 1988, cited in Faul, Erdfelder, Lang & Buchner, 2007) effect size calculations indicated that the effects of stimulus group on self-esteem were negligible, and some were opposite to the predicted direction. These results indicate that there are no significant differences between reported levels of trait self-esteem in women exposed to either very attractive or unattractive stimuli.

3.3.3 State Self-Esteem

Table 6 shows the mean total and sub-scale scores on the State Self-Esteem Scale for participants in each experimental condition together with the results of two-tailed independent samples t-tests comparing means between conditions and effect size estimates based on these.

Table 6:

Effects of Exposure to Different Levels of Attractiveness on State Self-Esteem.

State Self-Esteem Scale Score	Condition Mean (S.D.)		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Hot	Not				
Total	3.48 (.72)	3.62 (.60)	-1.12	121	.27	.20
Appearance	2.99 (.83)	3.11 (.77)	-.79	121	.43	.14
Social	3.61 (.93)	3.81 (.74)	-1.35	121	.18	.24
Performance	3.78 (.70)	3.86 (.62)	-.66	121	.51	.12

Table 6 shows that for the overall SSES, as well as its constituent subscales, participants in the *not* condition scored slightly higher than those in the hot condition. However, a series of two-tailed independent samples t-tests revealed no significant differences between participants in the hot and *not* conditions on the global SSES or any of its sub scales at the 5% alpha level. Cohen's *d* calculations suggested that exposing participants to highly attractive or unattractive others had only very weak effects on their levels of state self-esteem. This suggests that there were no differences in state self-esteem between females who had been exposed to the highly attractive or unattractive stimuli.

3.4 DISCUSSION

Study 2 found no evidence that participants who were exposed to images of highly attractive or unattractive individuals differed in their subsequent levels of either state or trait self-esteem. This challenges previous findings (Brown, et al. 1992, study 4; Thornton & Moore, 1993) and does not accord with predictions made by sociometer theory, which suggests that physical attractiveness forms an important component of relational value, and thus manipulating self-perceptions of attractiveness should have a causal influence on self-esteem. The results of Study 2 may therefore call into question the interpretation of the relationship between self-perceived attractiveness and self-esteem offered by sociometer theory. However, before accepting this, it is important to consider alternative explanations for the lack of significant effects observed in Study 2.

There are several possible methodological and theoretical explanations for these unpredicted non-significant results. One possibility is that the experimental manipulation simply did not have the desired effect of increasing the levels of self-perceived attractiveness of participants in the *not* condition relative to those in the hot condition. If self-perceived attractiveness was not successfully manipulated, this might explain why no differences in self-esteem were observed between the experimental groups. Unfortunately, given the large number of studies reported in Section 3.1 above which demonstrate the robustness of the comparison method of manipulating self-perceived attractiveness, a manipulation check of the self-perceived attractiveness of participants after being exposed to the comparison pictures was not included in the present study. In addition, given that any effects of an attractiveness

manipulation might be relatively short-lived, it was considered that including a manipulation check between the stimuli and the self-esteem measures may have disrupted any possible experimental effects. Indeed, Wood (1996) emphasised that it is important to measure the effects of any social comparisons as soon as possible after they occur. However, due to the lack of a manipulation check it is impossible to ascertain whether or not the experimental manipulation was effective and so whether the lack of significant differences in self-esteem can be explained theoretically as a lack of causal influence of self-perceived attractiveness or whether methodological issues are more highly implicated.

There is some evidence from the results obtained that methodological issues may be responsible for the lack of significant results. First, it may have been the case that there was simply not enough difference in levels of attractiveness between the very attractive and unattractive images selected for use in the study. If this were the case, the stimuli may not have been capable of inducing significantly higher levels of self-perceived attractiveness in participants who were exposed to unattractive as opposed to highly attractive others. Some support for this interpretation comes from participants' ratings of the attractive (mean rating = 4.4) versus unattractive (mean = 4.0) pictures. Although this difference was statistically significant, relative to the range of the seven point scale on which this was measured, it is not very large. This might suggest that the attractive pictures were not sufficiently more attractive than the unattractive ones to produce a contrast effect. However, this explanation seems unlikely given the large difference in mean ratings of hot (9.6) versus not (5.2) images demonstrated in the ratings of visitors to the website, which formed the basis for the initial selection of stimuli. Instead, these similar mean ratings in the

present sample may reflect the operation of serial contrast effects on attractiveness judgements of others (Kenrick & Gutierrez, 1980): Due to the extreme (high or low) level of attractiveness of the initial stimuli, subsequent examples are rated closer to the midpoint of the scale. These results may also reflect the manner in which participants interpreted the task. Simply being asked to rate the attractiveness of the pictures, participants may have believed that they were required to rate them relative to one another, rather than in absolute terms. This would have a similar effect to the serial contrast process in tending to influence participants' mean attractiveness ratings of the stimuli towards the mid-point of the scale, and thus reduce differences between mean ratings for the highly attractive and unattractive stimuli. Evidence for these processes would be provided by finding a relationship between the serial position of the stimulus picture and the mean attractiveness rating, for the initially presented pictures, such that this relationship would be negative in the hot pictures, and positive in the *not* pictures. Unfortunately, since Study 2 randomised the order of presentation of pictures for each participant and these orders were not recorded it is impossible to assess this possibility.

It is also possible that the two sets of stimulus pictures were sufficiently different in attractiveness (as suggested by the initial ratings which formed their selection criteria), but they nonetheless failed to produce an attractiveness contrast effect in participants. A possible reason for this could be that participants simply rated the pictures without either explicitly or implicitly comparing themselves to them. Whilst the study by Little and Mannion (2006), reported above, demonstrated a contrast effect using the same method, it is unclear whether this is a robust result. In the present study, it is possible that participants were not comparing themselves to the images, and this might

account for the lack of observed differences in self-esteem between the experimental conditions. In order to investigate this possibility, Study 3 attempted to force participants to explicitly compare themselves to the images by rewording the rating scale used to assess the pictures.

A further explanation for the lack of significant results in Study 2 could be that, despite the random allocation of participants to conditions, the experimental groups differed in their initial mean levels of self-perceived attractiveness and/or self-esteem. If participants in the hot group had higher initial levels of self-perceived attractiveness and self-esteem, this may have negated any effects of the manipulation on subsequent measures of these variables. Unfortunately, due to the fact that these variables were not measured before administering the manipulation, this possibility cannot be assessed.

Interestingly, one more recent study on attractiveness contrast effects and self-esteem found that individual differences in Contingent Self-Esteem (CSE; Crocker & Wolfe, 2001) mediated attractiveness contrast effects on self-esteem. CSE is a measure of the extent to which individuals base their feelings of self-worth on meeting personal or cultural standards and expectations, for example about physical attractiveness (Kernis, 2003). Patrick, Neighbours and Knee, (2004) found that women who were high in CSE, and especially attractiveness-related CSE, reported significantly lower body-esteem when they were exposed to pictures of highly attractive others. No such effect was obtained for participants who reported low levels of CSE. This study might explain the non-significant results obtained in Study 2; if participants in the sample had especially low levels of CSE, exposing them to attractive or unattractive others would not be expected to affect their levels of self-esteem. This possibility,

together with the alternative explanations for the null results of Study 2, was explored in Study 3.

CHAPTER 4

STUDY 3: A FURTHER INVESTIGATION OF THE POSSIBLE INFLUENCE OF ATTRACTIVENESS ON SELF-ESTEEM

4.1.1 An Extension of Study 2

Study 3 was designed to address the methodological limitations of Study 2 in order to further assess the possibility that manipulating self-perceived attractiveness will exert a causal influence on self-esteem. In particular, due to the omission of a manipulation check, the results of Study 2 do not indicate whether the experimental manipulation failed to produce an attractiveness contrast effect, or whether the lack of significant effects on self-esteem can be attributed to theoretical issues concerning the relationship between self-perceived attractiveness and self-esteem. In order to investigate this, Study 3 included a manipulation check, consisting of several questions designed to assess individuals' self-perceived attractiveness and romantic or sexual desirability, after exposure to either highly attractive or unattractive comparison images.

There is some disagreement in the literature as to whether contrasts with others directly affect participants' views of their own physical attractiveness, or whether comparisons instead affect related self-evaluations. Whilst the studies reported in Section 3.1 suggest that there are direct contrast effects on self-perceived physical attractiveness, a study by Richins (1991) did not find a significant difference in self-ratings of attractiveness between individuals who had been exposed to pictures of highly attractive models and those in a control condition. However, Richins' (1991) results demonstrated that individuals in the

former condition subsequently reported being less *satisfied* with their appearance than those in the control group. These results raise the possibility that comparisons with others may not directly affect self-perceived attractiveness but may instead affect related self-evaluations.

This contention was supported in a study by Gutierrez, Kenrick and Partch (1999). They exposed women to images of either highly attractive or unattractive others and asked them to subsequently rate their self-perceived attractiveness together with their desirability as a date, sexual and marriage partner. Whilst there was no significant contrast effect on self-perceived physical attractiveness, participants who were exposed to highly attractive targets rated themselves as less desirable as marriage partners than those who were exposed to unattractive others. Gutierrez et al. (1999) interpreted these results as demonstrating that contrast effects may not directly affect self-perceptions of physical attractiveness, but instead change the way that individuals assess their standing relative to others. They suggested that these results can be understood from an evolutionary perspective emphasising intrasexual competition for mates. Exposing participants to pictures of highly attractive others may increase their perception of the prevalence of these individuals, and thus cause them to evaluate their competitive position more negatively than those who have been exposed to unattractive others.

From a sociometer perspective (Leary & Baumeister, 2000), the relationship between self-perceived physical attractiveness and self-esteem should be mediated by individuals' perceptions of their desirability as a relational partner. Thus, any contrast effects on physical attractiveness would be expected to affect individuals' levels of self-esteem only if they also affected self-perceived relational value. In order to examine these issues, Study 3

included the same measures of self-perceived attractiveness and relational desirability used by Gutierrez et al. (1999).

As discussed in Section 3.4, the lack of significant differences between self-esteem in participants exposed to highly attractive or unattractive others might reflect the fact that there was only a small difference in the degree of attractiveness of the stimuli images between the experimental conditions. In order to address this issue, different stimuli sets were constructed for Study 3, although still using the same general method adopted by Daly and Wilson (2004) and Little and Mannion (2006). Thus, Study 3 was a partial replication of Study 2, using different stimuli.

Additionally, as discussed above, it is possible that participants in Study 2 failed to compare themselves to the stimulus images. Wood (1996) suggests that the key feature of social comparison processes is that they involve individuals thinking about social information in relation to themselves. Whilst participants in Study 2 were processing social information regarding the attractiveness of others, it is not clear that they were relating this to themselves, and so, according to Wood's (1996) definition, it is unclear whether social comparison occurred. In order to address this issue, Study 3 required participants to explicitly compare their attractiveness to the stimulus images in their responses. In order to achieve this, participants were asked to rate their level of attractiveness in comparison to each of the stimuli on seven point scales, ranging from 1 (*My face is much less attractive*) through 4 (*Same*) to 7 (*My face is much more attractive*). Thus, it is likely that participants in the high attractiveness image condition would be repeatedly endorsing the view that they were less attractive than others. In contrast, it is likely that most participants in the low attractiveness image condition would be predominantly reporting that

they were more attractive than the comparison targets. These repeated social comparisons may produce a contrast effect which was possibly absent in Study 2.

Despite previous findings which have demonstrated contrast effects on self-perceived attractiveness, there is some evidence to suggest that these effects may not occur in all individuals. For example, Henderson-King and Henderson-King (1997) demonstrated that women's body weight influenced their reactions to media depictions of highly attractive individuals. Heavier women reported lower levels of sexual attractiveness when exposed to ideal images than did those exposed to a neutral advert, whilst lighter women reported higher levels of sexual attractiveness when exposed to the ideal images relative to those in the control condition. Since body weight is a significant predictor of self-perceived physical attractiveness in women (Haavio-Mannila & Purhonen, 2001), Henderson-King and Henderson-King's (1997) results suggest that attractive women's social comparisons with highly attractive others may actually enhance their positive self-evaluations. This possibility was examined in Study 3, which measured participants' self-reported attractiveness both before and after exposure to either highly attractive or unattractive others.

Furthermore, individual differences in the contingencies on which individuals base their self-esteem (Crocker & Wolfe, 2001) may have an impact on how social comparisons affect their sense of self-worth. Patrick et al. (2004) showed that women who reported having higher levels of contingent self-esteem showed greater increases in body shame (i.e. decreases in body esteem) than did those with lower levels of contingent self-esteem following exposure to ideal media images of attractive women. Study 3 attempted to replicate and extend these findings by examining whether contingent self-

esteem interacts with physical attractiveness contrast effects on both state and trait self-esteem.

Study 3 involved initially measuring women's levels of self-perceived attractiveness together with their self-reported contingent self-esteem. Participants were then required to explicitly compare their level of facial attractiveness with a series of images of either highly attractive or unattractive women, before reporting their levels of self-perceived physical attractiveness and desirability as a long-term or short-term sexual or romantic partner. Participants then rated their self-perceived body esteem, state and trait levels of self-esteem. Following previous research on contrast effects on physical attractiveness, it was predicted that participants who had been exposed to highly attractive others would show subsequently lower levels of self-perceived attractiveness, body esteem and relational desirability (Gutierrez et al. 1999), and self-esteem (Brown et al. 1992; Thornton & Moore, 1993) than those who had been exposed to unattractive others. This contrast effect on self-esteem was predicted to interact with both pre-exposure self-reported attractiveness (Henderson-King & Henderson-King, 1997) and contingent self-esteem (Patrick et al. 2004). Specifically, it was predicted that women with higher initial levels of self-reported attractiveness would show a diminished attractiveness contrast effect on self-esteem, as would those with lower levels of contingent self-esteem.

4.2 METHOD

4.2.1 Design

Female participants were asked to report their level of self-perceived attractiveness and contingent self-esteem. They were randomly allocated to one of two conditions in which they were asked to compare themselves to pictures of either highly attractive or unattractive others. They were then asked to report their levels of self-perceived attractiveness and desirability, body esteem and state and trait self-esteem.

4.2.2 Participants

One hundred and twenty eight women between the ages of 18 and 60 (mean = 29.2 S.D. = 12.1) participated in the present study. Participants were recruited by sending emails to students and staff of the Universities of Huddersfield and Central Lancashire inviting them to take part in a study on self-perceptions of attractiveness and personality. Participants were also asked to forward the details of the study to any other women over the age of 18 whom they knew and might be willing to take part.

Participants were randomly allocated to experimental conditions by the test server. This resulted in 56 individuals participating in the hot condition, with 72 allocated to the *not* group.

Response sets were examined to ascertain whether they were received from computers with duplicate ID numbers, since this might indicate multiple

responding by the same participants. However there were no duplicate numbers in the received data.

The design of the experiment allowed participants to complete some parts of the test without finishing the experiment as a whole and some participants had missing data for some of the scales used. Participants with any missing data for a particular scale were excluded from analyses of that scale. This meant that different sample numbers were obtained for each part of the test. Therefore separate sample numbers are reported for each of the statistical analyses conducted and described below.

4.2.3 Materials

4.2.3.1 Contingent Self-Esteem

Contingent self-esteem was assessed using the Contingent Self-Esteem Scale (CSES; Paradise & Kernis, 1999). The scale consists of fifteen items designed to measure the extent to which individuals' feelings of self-worth are contingent on factors such as successful performance, approval from others, and perceptions of attractiveness. Example items include: "My overall feelings about myself are heavily influenced by how much other people like and accept me" and "An important measure of my worth is how physically attractive I am". Participants are required to rate each item on a Likert scale ranging from 1 (*Not at all like me*) to 5 (*Very much like me*). The scale has been reported to demonstrate adequate internal reliability (Cronbach's α ranges between .83 and .85; Knee, Canevello, Bush & Cook, 2008; Patrick et al. 2004) and internal reliability in the present sample was similar ($\alpha = .85$).

Since attractiveness-based contingent self-esteem was of particular interest in the present study, four items from the CSES which specifically related to physical attractiveness were grouped together to form an appearance contingent self-esteem (ACSE) sub-scale which was used in analysing the data from Study 3. These items were; “An important measure of my worth is how physically attractive I am”, “If I am told that I look good, I feel better about myself in general”, “Even on a day when I don't look my best, my feelings of self-worth remain unaffected” (reverse scored) and “My overall feelings about myself are heavily influenced by how good I look”. The sub-scale consisting of these items demonstrated an acceptable level of internal consistency ($\alpha = .71$) suggesting that it is a reliable measure of appearance-based contingent self-esteem in the current sample.

4.2.3.2 Attractiveness Manipulation

The stimuli used to manipulate participants' levels of self-perceived attractiveness were constructed in the same way as in Study 2, following the method of Wilson and Daly (2004) and Little and Mannion (2006). Pictures of 20 attractive (Hot; mean attractiveness rating = 9.6) and 20 unattractive (Not; mean rating = 5.4) women were downloaded from a freely accessible online database (www.hotornot.com) and formed the stimuli for the highly attractive and unattractive comparison conditions respectively. In contrast to Study 2, participants were asked to rate their own level of attractiveness relative to the images, rather than simply rating the images themselves.

4.2.3.3 Manipulation Checks

Five items developed by Gutierrez et al. (1999) were used to assess whether the comparison manipulation affected participants' levels of self-perceived attractiveness, romantic and sexual desirability. These items asked participants to reflect on the following statements "I feel that I am very physically attractive", "I believe that men would find me desirable as a date", "I believe that men would find me desirable as a sexual partner", "I am not very satisfied with the way I look" (reverse scored) and "I believe that men would find me desirable as a marriage partner". Participants were asked to rate their feelings about these statements on seven point scales ranging from 1 (*Not at all characteristic of me*) to 7 (*Very much characteristic of me*). These five items demonstrated a high level of internal consistency ($\alpha = .87$) suggesting that they form a reliable measure of self perceived attractiveness and desirability in the present sample.

In addition, the Body Esteem Scale (BES; Franzoi & Shields, 1984) used in Study 1 (described in detail in section 2.2.2.4 above) was also used as a manipulation check, in order to examine whether exposure to the highly attractive or unattractive images affected participants' positive and negative feelings about a number of aspects of their bodies. Because the comparison images most prominently displayed the faces of the women depicted, a facial sub-scale of the BES was also constructed which consisted of the items "nose", "lips", "ears", "chin", "appearance of eyes", "cheeks / cheekbones" and "face" and this "Facial BES" was also used in the analysis of the present data. The items of this sub-scale demonstrated an acceptable level of internal reliability ($\alpha = .77$) in the present sample.

4.2.3.4 State Self-Esteem

Participants' levels of state self-esteem were measured using the State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991) used in Study 2 and described in detail in section 3.2.3.2 above.

4.2.3.5 Global Trait Self-Esteem

Global trait self-esteem was assessed using the ten item Rosenberg (1965) Self-Esteem Scale (SES) and overall scores on the 54-item Personal Evaluation Inventory (PEI) (Shrauger & Schohn, 1995) used in Study 1 and described in detail in section 2.2.2 above.

4.2.3.6 Domains of Trait Self-Esteem

Specific domains of trait self-esteem were measured using the subscales of the 54-item Personal Evaluation Inventory (PEI: Shrauger & Schohn, 1995) used in Studies 1 and 2 and described in detail in section 2.2.2.3 above.

4.2.4 Procedure

When participants entered the web address for the study, the test server randomly loaded either the attractive (Hot) or unattractive (Not) version of the form, thus randomly assigning participants to either condition. These were identical in every respect except for the photographs displayed in the attractiveness manipulation part of the test (see below). The first page of the

form contained brief instructions initially thanking participants for agreeing to take part in the study. The instructions explained that participants would be required to rate their attractiveness compared to a number of pictures of females, and then answer some questions about various aspects of their own personalities. They then explained that participants' responses would be treated strictly anonymously and confidentially, and that they should not answer any questions with which they were uncomfortable. Participants were informed that they could withdraw from the study at any time without penalty. Participants were then asked to fill in boxes indicating their age and sex before pressing a "next page" button which took them to the pre-manipulation questions for the study. Any participants who reported being male were excluded from the study. On the next page, participants were asked to rate their level of physical attractiveness on a 10-point scale provided, with 1 corresponding to *very unattractive*, 5 to *average* and 10 to *very attractive*. They were then asked to complete the CSES. They were informed that they should read the statements below, think about the extent to which these applied to themselves, and respond by clicking on the appropriate box. They were informed that there were no right or wrong answers, so they should respond as honestly and accurately as possible. Having completed the CSES participants proceeded to the attractiveness comparison part of the study.

The instructions for the comparison manipulation informed participants that they were about to see a series of pictures of women and that for each one, they should indicate on the scale provided how attractive they considered themselves to be in comparison. As soon as they responded to each picture the next one would be displayed. Participants started responding by pressing the "next page" button. Those in the attractive condition rated themselves in

comparison to the hot pictures, whilst those in the unattractive condition responded to the *not* photos. The order in which the pictures were presented was randomised for each participant. Each photo was presented on a separate page above a rating scale ranging from 1 (*I am much less attractive*) through 4 (*I am equally attractive*) to 7 (*I am much more attractive*) and participants clicked on the appropriate box on the scale to indicate their response. As soon as participants responded, the next image was displayed. When participants had rated themselves against all 20 pictures they were taken to the page containing the manipulation-check questions.

Participants were informed that they should read the proceeding statements concerning how they felt about themselves and indicate the extent to which each of these reflected their current feelings using the scales provided. Participants then responded to the five attractiveness manipulation check items described above using seven point scales ranging from 1 (*Not at all characteristic of me*) to 7 (*Very much characteristic of me*). They then completed the BES: They were informed that they should rate their feelings towards a number of their own body parts and functions by entering the number which best represented these feelings into a response box.

Having completed these manipulation checks, participants were then asked to complete the SSES. They were informed that the questionnaire was designed to measure what participants were thinking at that moment. They were also informed that there was no right or wrong answer, and that the best answer was what they felt was true of themselves at that moment. They were asked to answer questions as they were true for them "RIGHT NOW". Participants proceeded to the SSES questions by pressing the "next page" button. The questions were presented in four pages containing five items each.

Participants indicated their level of agreement with each statement by clicking on the most relevant box on the five point scale. When they had finished completing the SSES, they were directed to the first page of the SES. Participants were asked to click on the response which best reflected their feelings towards each of the 10 statements comprising the SES. They were then directed to the first page of the PEI, which contained instructions for completing the scale. These stated that the following pages contained a number of statements that reflect common feelings, attitudes and behaviours. Participants were asked to read each statement carefully, think about whether they agreed or disagreed that it applied to them, and select the appropriate response. They were asked to try to respond honestly and accurately, but were informed that it was not necessary to spend much time deliberating about each item. They were instructed to think about how the item applied to them during the past two months unless some other time period was specified. They then proceeded to complete the scale by selecting appropriate responses on the four-point scales provided. When the participant had completed the PEI, they were taken to a debrief page which thanked them for participating and informed them that they could receive feedback on the aims and findings of the study by contacting the researcher at a provided email address. They were informed that if they had particular concerns about the issues raised by the study, they could contact the university counselling service. Participants were also informed that the researcher was conducting a follow up study (Study 4) investigating reaction times and attractiveness and asked to input their email address if they might be interested in taking part. Participants then submitted their data by pressing a button labelled "Submit Data". This sent participants' responses back to the server where they were collated for subsequent analysis.

4.3 RESULTS

4.3.1 Group Equivalence Checks

In order to assess whether the experimental manipulation affected participants' levels of self-perceived attractiveness, it was important to ascertain whether participants in each of the experimental groups initially reported similar levels of this trait. In order to assess this, a two-tailed, independent-samples t-test was conducted on participants' responses to the initial, 10-point measure of physical attractiveness used in the study. This revealed no significant difference in initial self-perceived attractiveness between participants in the hot (attractive comparison) and *not* (unattractive comparison) conditions (mean = 5.65 vs. 5.92 respectively, $t(124) = -.98$, $p = .33$). This indicates that participants in the two experimental conditions reported equivalent initial self-perceptions of attractiveness.

In addition, a two-tailed, independent samples t-test demonstrated no significant difference in the mean age of participants in the hot versus *not* groups (mean = 31 vs. 27.8 respectively, $t(126) = 1.48$, $p = .14$).

Finally, two-tailed, independent samples t-tests were conducted in order to examine whether there were significant differences in mean levels of contingent self-esteem between participants in each of the experimental groups. There was no significant difference in overall levels of contingent self-esteem between participants in the hot and *not* group (mean = 3.68 vs. 3.75 respectively, $t(116) = -.62$, $p = .54$). Similarly there was no significant difference in levels of appearance-based contingent self-esteem between participants in the hot and *not* conditions (mean = 3.64 vs. 3.75 respectively, $t(116) = -.85$, $p = .40$).

Taken together, these results suggest that there were no significant differences between the experimental groups in terms of their ages and initial levels of self-perceived attractiveness and contingent self-esteem.

4.3.2 Comparison Ratings

Participants' comparisons of their own levels of attractiveness to the manipulation stimuli were assessed by examining their mean responses to the pictures. Participants in the hot condition, who were exposed to pictures of highly attractive women, on average reported being only slightly less attractive than these comparison stimuli (mean = 3.97, SD = 1.19). In contrast, participants in the *not* condition, who were exposed to pictures of unattractive women, on average reported being considerably more attractive than the comparison images (mean = 5.85, SD = .90). A one-tailed, independent samples t-test revealed that women who were exposed to the unattractive stimuli compared themselves on attractiveness significantly more favourably to the pictures than women who were exposed to the attractive images ($t(118) = 9.88, p < .001$). These results suggest that participants in the unattractive condition were generally comparing themselves favourably to the comparison images, whereas participants in the attractive condition were on average reporting themselves to be slightly less attractive than the comparison images.

4.3.3 Manipulation Checks

In order to test whether the comparison manipulation affected participants' levels of self-perceived physical attractiveness, desirability and body esteem, a

series of one-way ANCOVAs were performed. In order to control for initial differences in self-perceived attractiveness, participants' pre-manipulation scores on this variable were entered as a covariate in the analyses. These analyses revealed that participants in the *not* condition who had been exposed to unattractive comparison images subsequently reported significantly higher levels of self-perceived attractiveness (in response to the statement "I feel that I am very physically attractive") than those in the hot condition (mean = 4.13 vs. 3.23, respectively; $F(1,122) = 19.82, p < .001, \eta_p^2 = .14$). Similarly, participants in the *not* condition reported significantly higher self-perceptions of their desirability as a date than those in the hot condition (mean = 4.19 vs. 3.46 respectively; $F(1,122) = 11.04, p < .01, \eta_p^2 = .06$). However, there were no significant differences between participants in the *not* and hot conditions with respect to their subsequent self-perceptions of their desirability as a sexual partner (mean = 4.19 vs. 3.79 respectively; $F(1,122) = 1.48, p = .23, \eta_p^2 = .01$) or marriage partner (mean = 4.27 vs. 3.91 respectively; $F(1,122) = .06, p = .81, \eta_p^2 = .01$) or their level of satisfaction with their attractiveness (mean = 4.15 vs. 3.91 respectively, $F(1,122) = .83, p = .36, \eta_p^2 = .01$), although all of the mean differences were in the predicted direction. Similarly, there were no significant differences between participants in the *not* and hot conditions with respect to their subsequent mean levels of self-reported overall body esteem (mean = 3.19 vs. 3.06 respectively, $F(1,122) = .51, p = .48, \eta_p^2 = .01$) and facial body esteem (mean = 3.56 vs. 3.49 respectively, $F(1,122) = .08, p = .77, \eta_p^2 = .01$), although again the mean differences were in the expected direction.

Taken together, these analyses suggest that although the comparison manipulation affected participants' self-perceived attractiveness and desirability

as a date, it had no significant effect on self-perceptions of desirability as a marriage or sexual partner, appearance satisfaction, or bodily or facial esteem.

4.3.4 Contrast Effects on State Self-Esteem

Table 7 displays mean state self-esteem scores for participants in both conditions, together with the results of two-tailed independent samples t-tests comparing these means between conditions, and effect size estimates based on these.

Table 7:

Physical Attractiveness Comparison Effects on State Self-Esteem.

State Self-Esteem Scale Score	Condition Mean (S.D.)		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Hot	Not				
Total	3.34 (.80)	3.37 (.71)	-0.23	114	.82	.04
Appearance	2.81 (.84)	2.96 (.88)	-0.92	114	.36	.17
Social	3.52 (1.03)	3.46 (.85)	.35	114	.72	-.06
Performance	3.61 (.81)	3.64 (.72)	-0.19	114	.86	.04

Table 7 shows that participants in both conditions reported similar levels of subsequent state self-esteem. Two-tailed independent samples t-tests showed no significant differences between conditions in either total or sub-scale scores of the SSES and Cohen's *d* (Cohen, 1988, cited in Faul et al. 2007) effect size estimates indicated that the effects of condition on state self-esteem were negligible. These results suggest that requiring participants to compare themselves with highly attractive or unattractive others had no significant effect on their subsequent state levels of self-esteem.

4.3.5 Contrast Effects on Trait Self-Esteem

Table 8 displays mean trait self-esteem scores, as measured by both the SES and PEI, for participants in both the hot and *not* conditions, together with the results of two-tailed independent samples t-tests comparing these means between conditions, and effect size estimates based on these.

Table 8, shows that participants in both the hot and *not* conditions reported similar subsequent levels of trait self-esteem. Two-tailed independent samples t-tests revealed no significant differences between conditions in post-manipulation trait self-esteem on any measure. These results indicate that requiring women to compare their level of physical attractiveness with highly attractive or unattractive others had no effect on their subsequent levels of trait self-esteem.

Table 8:

Physical Attractiveness Comparison Effects on Trait Self-Esteem

Self-esteem Scale	Condition Mean (S.D.)		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Hot	Not				
SES Total	2.88 (.57)	2.86 (.54)	.21	123	.42	-.04
PEI Total	2.58 (.48)	2.55 (.37)	.36	90	.36	-.08
PEI Appearance	2.50 (.55)	2.56 (.56)	-.46	90	.32	.10
PEI Romantic	2.70 (.54)	2.70 (.62)	.01	90	.50	.01
PEI Social	2.69 (.71)	2.69 (.60)	.01	90	.50	.01
PEI Speaking with People	2.56 (.89)	2.49 (.78)	.43	90	.34	-.08
PEI Academic	2.75 (.62)	2.63 (.59)	.98	90	.17	-.21
PEI Mood	2.53 (.59)	2.48 (.55)	.51	90	.62	-.11
PEI General	2.47 (.55)	2.54 (.52)	-.69	90	.49	.15

PEI = Personal Evaluation Inventory, SES = Self-Esteem Scale

4.3.6 Effects of Initial Self-Perceived Attractiveness

In order to examine whether initial self-perceived attractiveness interacted with any possible physical attractiveness contrast effects on self-esteem, a series of hierarchical multiple regression analyses were conducted with experimental condition (dummy coded) and pre-exposure self-perceived attractiveness and the interaction between these as the predictor variables (see Miles & Shevlin, 2001), and various measures of state and trait self-esteem as the criterion.

Hierarchical multiple regression analyses were conducted with participants' scores on the total and appearance based sub-scale of SSES as the criterion variables. Experimental condition (dummy coded; 1 = hot, 2 = not) and initial self-perceived attractiveness (centred) were entered on the first step, and the interaction between these was entered on the second step. Table 9 shows the results of these analyses.

Table 9:

Interactive Effects of Initial Self-Perceived Attractiveness and Contrast Effects on State Self-Esteem

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
SSES Total	Step 1			
	($R^2 = .22, p < .01$)			
	Initial SPA	.25	.04	.47*
	Condition	-.02	.13	-.02
	Step 2			
	($\Delta R^2 = .00, p = .95$)			
	Initial SPA	.26	.14	.49
Condition	-.02	.13	-.02	
	Condition X SPA	-.01	.09	-.02
SSES Appearance	Step 1			
	($R^2 = .42, p < .01$)			
	Initial SPA	.39	.04	.65*
	Condition	.06	.12	.62
	Step 2			
	($\Delta R^2 = .00, p = .56$)			
	Initial SPA	.31	.14	.52*
Condition	.06	.12	.04	
	Condition X SPA	.05	.09	.14

SSES = State Self-Esteem Scale, SPA = Self-Perceived Attractiveness

* $p < .05$

Table 9 shows that the only significant predictor of both overall and appearance-based state self-esteem was participants' initial levels of self-perceived attractiveness. This variable together with comparison condition accounted for approximately 22% of the variance in overall state self-esteem, and 42% of the variance in appearance-based self-esteem. However, adding the interaction term into the second step of the analyses did not increase the percentage of variance explained in either overall or appearance-based state self-esteem. These results indicate that, contrary to predictions, initial self-perceived attractiveness did not interact with comparison condition in predicting participants' subsequent levels of state self-esteem.

Similarly, a series of hierarchical multiple regression analyses were conducted to examine whether initial self-perceived attractiveness interacted with comparison condition in predicting subsequent levels of trait self-esteem. Participants' scores on the SES, overall and appearance sub-scale scores of the PEI were entered as criterion variables and condition and initial SPA entered on the first step, and the interaction term entered on the second step were entered as predictors. Table 10 shows the results of these analyses.

Table 10:
Interactive Effects of Initial Self-Perceived Attractiveness and Contrast Effects on Trait Self-Esteem

Criterion	Predictor	B	SE B	B
SES	Step 1			
	(R ² = .19, p < .01)			
	Initial SPA	.17	.03	.44*
	Condition	-.04	.09	-.03
	Step 2			
	(ΔR ² = .00, p = .64)			
	Initial SPA	.23	.12	.57
	Condition	-.04	.09	-.03
	Condition X SPA	-.03	.07	-.14
	PEI Total	Step 1		
(R ² = .29, p < .01)				
Initial SPA		.17	.03	.54*
Condition		-.04	.08	-.05
Step 2				
(ΔR ² = .02, p = .11)				
Initial SPA		.31	.09	.99*
Condition		-.04	.08	-.05
Condition X SPA		-.09	.06	-.48
PEI Appearance		Step 1		
	(R ² = .52, p < .01)			
	Initial SPA	.29	.03	.72*
	Condition	.02	.08	.02
	Step 2			
	(ΔR ² = .00, p = .75)			
	Initial SPA	.26	.10	.65*
	Condition	.02	.08	.02
	Condition X SPA	.02	.06	.08

SES = Self-Esteem Scale, PEI = Personal Evaluation Inventory, SPA = Self-Perceived Attractiveness
 * p < .05

Table 10 shows that the only significant predictor of both overall and appearance-based trait self-esteem was participants' initial levels of self-perceived attractiveness. This variable, together with comparison condition, accounted for approximately 19% of the variance in overall trait self-esteem as measured by the SES, 29% of the variance in overall trait self-esteem as measured by the PEI, and 52% of the variance in appearance-based trait self-esteem. However, adding the interaction term into the second step of the analyses did not increase the percentage of variance explained in either overall or appearance-based trait self-esteem. These results indicate that, contrary to predictions, initial self-perceived attractiveness did not demonstrate any interaction with comparison condition in predicting participants' subsequent levels of trait self-esteem.

The results of these analyses indicate that whilst initial self-perceived attractiveness positively predicted women's global and appearance-related state and trait self-esteem there was no overall contrast effect on any of these measures. Furthermore, contrary to predictions, there is no evidence of any interactions between contrast effects and initial self-perceived attractiveness in predicting self-esteem in the present sample.

4.3.7 Effects of Contingent Self-Esteem

In order to examine whether participants' levels of contingent self-esteem interacted with any possible physical attractiveness contrast effects on self-esteem, a series of hierarchical multiple regression analyses were conducted. Since initial, pre-manipulation self-perceived attractiveness, was shown to

significantly predict self-esteem in the current sample (see above), its effects were controlled for by entering it as a predictor variable on the first step of each regression analysis (see Tabachnick & Fidell, 1989). Following this, predictor variables of participants' scores on the CSE scale, together with the experimental condition (dummy coded) were entered on the second step, and the interaction between these on the third step of the analysis. These predictor variables were entered into separate regression analyses using global and appearance based state self-esteem, global trait SES scores, and global and appearance sub-scale scores on the PEI as criterion variables. Tables 11-15 show the results of these analyses.

Table 11:

Interaction Effects of Comparison Condition and Contingent Self-Esteem on Subsequent Global State Self-Esteem

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
SSES Total	Step 1			
	($R^2 = .21, p < .01$)			
	Initial SPA	.24	.05	.46*
	Step 2			
	($\Delta R^2 = .33, p < .01$)			
	Initial SPA	.21	.04	.40*
	Condition	.04	.10	.03
	CSE	-.74	.09	-.58*
	Step 3			
	($\Delta R^2 = .02, p = .07$)			
	Initial SPA	.22	.04	.41*
	Condition	.04	.10	.03
	CSE	-1.26	.29	-.98*
Condition X CSE	.32	.17	.42	

SSES = State Self-Esteem Scale, SPA = Self-Perceived Attractiveness, CSE = Contingent Self-Esteem

* $p < .01$

Table 12:

Interaction Effects of Comparison Condition and Contingent Self-Esteem on Subsequent Appearance-Based State Self-Esteem

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
SSES Appearance	Step 1			
	($R^2 = .42, p < .01$)			
	Initial SPA	.39	.05	.65*
	Step 2			
	($\Delta R^2 = .16, p < .01$)			
	Initial SPA	.37	.04	.61*
	Condition	.12	.11	.07
	CSE	-.60	.10	-.40*
	Step 3			
	($\Delta R^2 = .01, p = .23$)			
	Initial SPA	.22	.04	.62*
	Condition	.12	.11	.07
	CSE	-.98	.33	-.66*
Condition X CSE	.24	.20	.27	

SSES = State Self-Esteem Scale, SPA = Self-Perceived Attractiveness, CSE = Contingent Self-Esteem

* $p < .01$

Table 13:

Interaction Effects of Comparison Condition and Contingent Self-Esteem on Subsequent Global Trait Self-Esteem Measured with the Self-Esteem Scale

Criterion	Predictor	B	SE B	B
SES	Step 1			
	(R ² = .20, p < .01)			
	Initial SPA	.18	.03	.44*
	Step 2			
	(ΔR ² = .25, p < .01)			
	Initial SPA	.15	.03	.37*
	Condition	.01	.08	.00
	CSE	-.48	.07	-.51*
	Step 3			
	(ΔR ² = .00, p = .84)			
	Initial SPA	.15	.03	.37*
	Condition	.01	.08	.00
	CSE	-.53	.23	-.55*
Condition X CSE	.03	.14	.05	

SES = Self-Esteem Scale, SPA = Self-Perceived Attractiveness, CSE = Contingent Self-Esteem

* p < .05

Table 14:

Interaction Effects of Comparison Condition and Contingent Self-Esteem on Subsequent Global Trait Self-Esteem Measured with the Personal Evaluation Inventory

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
PEI Total	Step 1			
	($R^2 = .29, p < .01$)			
	Initial SPA	.17	.03	.54*
	Step 2			
	($\Delta R^2 = .15, p < .01$)			
	Initial SPA	.16	.03	.51*
	Condition	-.04	.07	-.05
	CSE	-.29	.06	-.39*
	Step 3			
	($\Delta R^2 = .01, p = .23$)			
	Initial SPA	.16	.03	.51*
	Condition	-.05	.07	-.05
	CSE	-.51	.20	-.69*
Condition X CSE	.15	.13	.32	

PEI = Personal Evaluation Inventory, SPA = Self-Perceived Attractiveness, CSE = Contingent Self-Esteem

* $p < .05$

Table 15:

Interaction Effects of Comparison Condition and Contingent Self-Esteem on Subsequent Appearance-Based Trait Self-Esteem

Criterion	Predictor	B	SE B	B
PEI Appearance	Step 1			
	(R ² = .51, p < .01)			
	Initial SPA	.30	.03	.72*
	Step 2			
	(ΔR ² = .05, p < .05)			
	Initial SPA	.29	.03	.70*
	Condition	.05	.08	.04
	CSE	-.22	.07	-.23*
	Step 3			
	(ΔR ² = .00, p = .51)			
	Initial SPA	.29	.03	.70*
	Condition	.04	.08	.04
	CSE	-.37	.23	-.37
Condition X CSE	.10	.15	.16	

PEI = Personal Evaluation Inventory, SPA = Self-Perceived Attractiveness, CSE = Contingent Self-Esteem

* p < .01

Tables 11-15 show that, in each of these analyses, contingent self-esteem significantly and negatively predicted post-manipulation self-esteem. However, neither condition nor the interaction between condition and CSE significantly predicted participants' scores on any of the criterion measures of self-esteem.

Similar analyses were undertaken to examine whether specifically appearance-based CSE interacted with condition in predicting self-esteem. Once again, hierarchical multiple regressions were carried out entering initial self-perceived attractiveness on the first step, appearance-based CSE and condition (dummy coded) on the second step, and the interaction between appearance CSE and condition on the third step as predictors, using scores on overall and appearance based SSES, SES, and overall and appearance PEI as criterion variables. Tables 16-20, below, show the results of these analyses.

Tables 16-20 show that in each of these analyses, appearance-based contingent self-esteem significantly and negatively predicted post-manipulation self-esteem. However neither condition nor the interaction between condition and appearance-based CSE significantly predicted participants' scores on any of the criterion measures of self-esteem.

The results of these analyses suggest that participants with higher levels of both overall and appearance-based contingent self-esteem reported lower levels of both global and appearance-based state and trait self-esteem, but that CSE did not interact with physical attractiveness contrast in predicting self-esteem.

Table 16:

Interaction Effects of Comparison Condition and Appearance-based Contingent Self-Esteem on Subsequent Global State Self-Esteem

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
SSES Total	Step 1			
	($R^2 = .21, p < .01$)			
	Initial SPA	.24	.05	.46*
	Step 2			
	($\Delta R^2 = .29, p < .01$)			
	Initial SPA	.26	.04	.50*
	Condition	.04	.10	.03
	ACSE	-.55	.07	-.54*
	Step 3			
	($\Delta R^2 = .00, p = .61$)			
	Initial SPA	.26	.04	.50*
	Condition	.04	.11	.03
	ACSE	-.44	.22	-.44*
Condition X ACSE	-.07	.14	-.11	

SSES = State Self-Esteem Scale, SPA = Self-Perceived Attractiveness, ACSE = Appearance-Based Contingent Self-Esteem

* $p < .05$

Table 17:

Interaction Effects of Comparison Condition and Appearance-Based Contingent Self-Esteem on Subsequent Appearance-Based State Self-Esteem

Criterion	Predictor	B	SE B	B
SSES Appearance	Step 1			
	(R ² = .42, p < .01)			
	Initial SPA	.39	.05	.65*
	Step 2			
	(ΔR ² = .17, p < .01)			
	Initial SPA	.41	.04	.68*
	Condition	.12	.11	.07
	ACSE	-.49	.08	-.41*
	Step 3			
	(ΔR ² = .00, p = .81)			
	Initial SPA	.41	.04	.68*
	Condition	.12	.11	.07
	ACSE	-.44	.23	-.37
	Condition X ACSE	-.04	.15	-.05

SSES = State Self-Esteem Scale, SPA = Self-Perceived Attractiveness, ACSE = Appearance-Based Contingent Self-Esteem

* p < .01

Table 18:

Interaction Effects of Comparison Condition and Appearance-based Contingent Self-Esteem on Subsequent Trait Self-Esteem as Measured by the Self-Esteem Scale

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
SES	Step 1			
	($R^2 = .20, p < .01$)			
	Initial SPA	.18	.03	.44*
	Step 2			
	($\Delta R^2 = .14, p < .01$)			
	Initial SPA	.19	.03	.48*
	Condition	.00	.09	.00
	ACSE	-.29	.06	-.38*
	Step 3			
	($\Delta R^2 = .00, p = .45$)			
	Initial SPA	.19	.03	.48*
	Condition	.01	.09	.01
	ACSE	-.16	.19	-.21
Condition X ACSE	-.09	.12	-.18	

SES = Self-Esteem Scale, SPA = Self-Perceived Attractiveness, ACSE = Appearance-Based Contingent Self-Esteem

* $p < .01$

Table 19:

Interaction Effects of Comparison Condition and Appearance-based Contingent Self-Esteem on Subsequent Trait Self-Esteem as Measured by the Personal Evaluation Inventory

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
PEI Total	Step 1			
	($R^2 = .29, p < .01$)			
	Initial SPA	.17	.03	.54*
	Step 2			
	($\Delta R^2 = .12, p < .01$)			
	Initial SPA	.18	.03	.57*
	Condition	-.04	.07	-.05
	ACSE	-.19	.05	-.34*
	Step 3			
	($\Delta R^2 = .00, p = .50$)			
	Initial SPA	.18	.03	.57*
	Condition	-.04	.07	-.05
	ACSE	-.29	.15	-.51
Condition X ACSE	.07	.10	.18	

PEI = Personal Evaluation Inventory, SPA = Self-Perceived Attractiveness,
 ACSE = Appearance-Based Contingent Self-Esteem

* $p < .01$

Table 20:

Interaction Effects of Comparison Condition and Appearance-Based Contingent Self-Esteem on Subsequent Appearance-Based Trait Self-Esteem

Criterion	Predictor	<i>B</i>	<i>SE B</i>	<i>B</i>
PEI Appearance	Step 1			
	($R^2 = .51, p < .01$)			
	Initial SPA	.30	.03	.72*
	Step 2			
	($\Delta R^2 = .06, p < .01$)			
	Initial SPA	.31	.03	.74*
	Condition	.05	.08	.04
	ACSE	-.19	.06	-.24*
	Step 3			
	($\Delta R^2 = .00, p = .75$)			
	Initial SPA	.31	.03	.74*
	Condition	.05	.08	.04
	ACSE	-.24	.17	-.31
Condition X ACSE	.04	.11	.07	

PEI = Personal Evaluation Inventory, SPA = Self-Perceived Attractiveness,

ACSE = Appearance-Based Contingent Self-Esteem

* $p < .01$

4.4 DISCUSSION

4.4.1 Implications of the Current Results

The results from Study 3 suggest that requiring women to explicitly compare their level of attractiveness to images of highly attractive or unattractive others has no effect on their subsequent levels of self-reported self-esteem. These results do not accord with the predictions derived from sociometer theory, which were that altering women's self-perceptions of their physical attractiveness should have an effect on their self-perceived relational desirability and subsequent self-esteem. Moreover, the results of the present study contradict earlier findings demonstrating a physical attractiveness contrast effect on participants' subsequent levels of self-esteem (Brown et al. 1992; Thornton & Moore, 1993).

The results indicate that individuals who report higher levels of contingent self-esteem, i.e. those who base their feelings of self-worth on their performance, attractiveness and social acceptance subsequently report lower levels of both state and trait self-esteem across a variety of measures. These findings support previous research which suggests that there is a negative correlation between the extent to which individuals base their self-esteem on external contingencies and their overall feelings of self-worth (Crocker & Wolfe, 2001). Furthermore, the present findings support theories of self-esteem which suggest that genuine, stable self-esteem is non-contingent (e.g. Kernis, 2003). However, the present study found no evidence for an interaction between contingent self-esteem and physical attractiveness contrast effects on self-esteem. Thus, although Patrick et al. (2004) showed that women who reported

higher levels of contingent self-esteem reported greater increases in body shame following exposure to highly attractive others than those with low CSE, this interaction does not appear to generalise to participants' feelings of self-worth.

The current study also demonstrated that although participants' initial perceptions of their own attractiveness significantly predicted self-esteem, as demonstrated in Study 1, and in accordance with predictions from sociometer theory, these self-perceptions did not interact with physical attractiveness contrast effects in predicting self-esteem.

There are several potential explanations for the overall lack of a physical attractiveness contrast effect on self-esteem. It is possible that the manipulation did not produce a strong or reliable contrast effect on the attractiveness self-perceptions of the participants. Whilst, after controlling for initial levels of self-perceived attractiveness, participants who had compared themselves to highly attractive others subsequently reported lower levels of self-perceived attractiveness and desirability as a date in comparison to those who had been exposed to unattractive others, differences between experimental groups on items measuring desirability as a sexual and marriage partner did not reach significance (although the differences were in the predicted direction). These results contrast with those of Gutierrez et al. (1999) who found that women who were exposed to images of highly attractive others subsequently reported lower levels of self-perceived desirability as a marriage partner, but not as a date or sexual partner, than those who were exposed to an unattractive other. These authors suggested that their findings reflected an awareness in women that men may devalue their general preference for attractiveness in mates when seeking short term partners. This may also account for the lack of a significant

result with respect to desirability as a sexual partner in the current study. The current lack of significant results for desirability as a marriage partner may be attributed to the fact that several of the participants in the current sample could already have been married, and thus interpreted the question differently from those in the study by Gutierrez et al. (1999). Unfortunately, given that specific demographic data was not collected in the present study (and also not reported by Gutierrez et al. 1999) this possibility is impossible to assess. Nonetheless, after controlling for initial levels of self-perceived attractiveness, the contrast effect on self-reported attractiveness was highly significant in the present study, despite the finding that there was no significant initial difference in self-perceived attractiveness between groups, and this strongly suggests that the manipulation was successful in affecting participants' self-perceptions of attractiveness. Moreover, there was some evidence that this also affected participants' self-perceptions of their desirability as a partner, and hence their relational value. Yet, contrary to predictions derived from sociometer theory, this did not affect participants' subsequent levels of self-esteem.

Although the present study demonstrated a contrast effect on self-perceptions of attractiveness, comparisons of appearance satisfaction and body esteem between experimental groups yielded non-significant results. Thus requiring women to compare themselves with highly attractive or unattractive others appears to affect their self-perceptions, but not their evaluative, affective responses, in the present study. This may explain why the attractiveness manipulation did not affect self-esteem in the current participants.

These results contrast with the findings of studies examining the effects of exposure to thin-ideal highly attractive media images on the body image of females (Want, 2009) which suggest that physical attractiveness contrast

effects can negatively influence women's feelings about their own levels of attractiveness. However, within the literature, there are a great deal of contradictory and non-significant findings and Want (2009) reports that over ten percent of the studies included in his analysis actually report positive effects of exposure to ideal images. Such effects, whereby participants report higher levels of positive feelings about their appearance following exposure to highly attractive others represent *assimilation* effects of social comparison processes (e.g. Mussweiler, 2001). For example, a study by Mills, Polivy, Herman and Tiggeman (2002) showed that exposing female restricted eaters (dieters) to images of thin others actually lead them to report higher levels of subsequent appearance-related self-esteem than those who were exposed to heavy others. Similarly, Joshi, Herman and Polivy (2004) showed that restrained eaters reported more positive body image and higher social self-esteem following exposure to thin models than to control images. The authors of these studies suggest that thin models may act as an inspiration for female restricted eaters and thus, at least temporarily, produce positive feelings in these individuals. This explanation draws on social comparison theory, which suggests that social comparisons may be motivated by a desire for self-improvement in addition to self-evaluation (Wood, 1989). Furthermore, Collins (1996) argued that upward social comparisons (i.e. with individuals who are perceived to be superior on a particular dimension) can also lead to self-enhancement (increased positive self-evaluation) in individuals if the comparison target is perceived to be similar, and the perceived discrepancy is perceived to be relatively small. Under these conditions, individuals may be able to assess themselves as being "one of the better ones" i.e. belonging to a superior group.

These considerations may explain the lack of significant differences in self-esteem between experimental groups in the present study. In this study, the comparison targets were images of ordinary women of a similar age to the participants. In the case of women in the hot condition, although their comparison targets were highly attractive individuals, mean comparison ratings during the manipulation suggest that on average, participants reported being only slightly less attractive than the images presented. Thus it seems plausible that many participants in the hot condition may have perceived themselves as being similar in attractiveness to the highly attractive images (assimilation), and thus possibly experienced a self-enhancement effect of increased self-esteem. Given that participants in the *not* condition may have also experienced self-enhancement through a contrast effect with the unattractive images, whereby they subsequently perceived themselves as more attractive, this may explain the lack of significant differences in self-esteem in the experimental groups.

Unfortunately, due to concerns about introducing excessive demand characteristics into the study, no measure of self-esteem was included before the comparison procedure in the present study and so it is impossible to assess whether both groups experienced a self-esteem enhancement effect. However, future studies could administer measures before and after the manipulation to examine how both upward and downward attractiveness comparisons affect self-esteem. If both manipulations produced subsequent increases in self-esteem, this would support the above explanation for the lack of post-exposure differences in the present study.

A potential issue with this explanation is that the present results demonstrate that although there were no comparison effects on self-esteem, participants in the hot condition did perceive themselves as being less attractive

than those in the *not* condition after exposure to the images (and despite a lack of initial differences in self-perceived attractiveness). If participants in both conditions were experiencing self-enhancement effects, it is not clear why these should differentially affect their affective (self-esteem) and perceptual (self-perceived attractiveness) responses. It is possible that these discrepancies may be the result of demand characteristics in the study. Having repeatedly reported being more or less attractive than the comparison images, participants may well have had expectations about how they were “supposed” to respond to the manipulation check, self-perceived attractiveness items. These expectations may not have extended to the self-esteem measures, which were both less clearly related to attractiveness, and more temporally distant from the manipulation. The importance of accounting for demand characteristics in social comparison research is discussed by Wood (1996) and highlighted in the study by Mills et al. (2002) described above. This showed that eating-restrained women reported higher levels of depression in response to viewing thin ideal images only when the measure was presented as being part of the same, as opposed to an unrelated, study. These issues surrounding potential demand characteristics could be addressed by conducting future studies employing implicit manipulations and measures of self-perceived attractiveness and self-esteem (see below).

The discrepancy between the observed contrast effect on self-perceived attractiveness but not on self-esteem in the present study might also be explained in terms of inspiration and self-improvement motives in social comparison (Wood, 1989). Participants in the hot condition reported lower post manipulation self-perceived attractiveness than those in the *not* condition, but, as described above, their scores on the manipulation items suggest that they

considered themselves to be only slightly less attractive than the target images. They may, therefore, have believed that the depicted high level of attractiveness was attainable for them, and the images may thus have had an inspirational effect, in a manner similar to those described in eating restricted individuals' comparisons with slim models (Mills et al. 2002; Joshi et al. 2004). One could imagine these participants thinking, "I am only slightly less attractive than these beautiful women, so perhaps I can be like that" and experiencing a resultant boost in self-esteem. At present these suggestions are highly speculative, and the measures employed in the current study do not allow for an examination of such complex issues. However, future studies could address this by employing open ended, free response measures or interviews to examine women's responses to attractiveness-focused social comparisons.

4.4.2 Choice of Comparison Targets

The issues discussed above also relate to the specific comparison targets employed in the current study. This study used images of ordinary women, comparable in age to the participant sample, who had been rated by others as being either highly attractive or unattractive. This contrasts with the thin-ideal images of fashion models typically used in body image research (Want, 2009) which purposely depict images of women who represent extremes of attractiveness, and are, by design, very far from being ordinary. Furthermore these women can be described as being "professionally attractive" in that their occupations rely on their attractiveness, and they can be expected to expend an unusually large amount of time and effort on maintaining and enhancing their attractiveness. This difference in the stimuli employed may well explain why the

present study failed to replicate the typical attractiveness self-esteem contrast effects reported in the body image literature (Want, 2009).

However, as described above, the present choice of stimuli was driven by theoretical considerations derived from sociometer theory and these considerations are also reflected in the social comparison literature. According to social comparison theory, people should choose as comparison targets individuals whom they perceive to be similar to themselves on relevant dimensions, since these will provide the most useful information about their relative standing or performance (Festinger, 1954). Studies suggest that people not only seek comparison targets whom they perceive to be similar on relevant dimensions but also that the affective and evaluative results of comparisons are much stronger with similar as opposed to dissimilar targets (see Wood, 1989 for a review of relevant research). From this perspective, it is unclear whether ideal media images represent the most appropriate stimuli for use in studies examining the general impact of social comparisons of physical attractiveness on self-esteem. Given that the focus of most of the studies that use thin-ideal images is specifically to examine the effects of idealised media images on women's self-perceptions and evaluations, this does not represent a limitation in itself, but these considerations limit the extent to which these studies can be viewed as general demonstrations of processes of social comparison of attractiveness. Whilst it is clear that most women in modern societies are exposed to a great many idealised media images, it is also true that they are more likely to come into contact with ordinary women with whom they might be expected to compare themselves.

The study by Cash et al. (1983), described above, is particularly relevant to this discussion. It showed that women who were exposed to images of highly

attractive others reported lower self-perceived attractiveness than those who had been exposed to exactly the same images presented along with brand names, as if they were advertisements in the media. The authors referred to the latter comparison targets as “professionally attractive”, and these images did not themselves produce an attractiveness contrast effect. The authors explain this in terms of similarity effects in social comparison, and it may also reflect an example of defensive processing (see below). This study is an excellent demonstration of how participants’ perceptions of the relevance of comparison targets may affect the results of the comparison process.

Given these considerations, it might be thought surprising that the majority of studies using ideal images do demonstrate a contrast effect (Want, 2009). Strahan, Wilson, Cressman and Buote (2006) addressed this issue by arguing that widespread norms for thinness and beauty in western cultures may override normal social comparison similarity concerns. They used adverts for cosmetic, physical improvement and weight loss products to highlight these norms to one group of participants (salience condition) whilst exposing others to neutral adverts for cars, credit cards etc. Participants in the high salience condition subsequently reported considering a professional model to be an equally relevant comparison target as a peer, whereas those in the neutral condition felt that the peer was a more relevant comparison target. In addition, participants in the salience condition made significantly more spontaneous comparisons with the model than with the peer, whereas this pattern of results was reversed in the neutral condition. Thus, highlighting cultural norms for attractiveness may cause individuals to view professional models as relevant comparison targets. This might account for the general finding of a contrast effect of thin-ideal media images on self-perceptions and affect even though the

individuals depicted in these images are likely to be perceived as highly dissimilar to most individuals.

In addition, it may be the case that the typical finding that exposing women to thin-ideal images exerts a contrast effect on their self-perceptions and evaluations and affect (see Want, 2009) reflects demand characteristics inherent in such studies. There is a growing awareness of, and media attention towards, the possibility that thin models may contribute to body dissatisfaction and eating disorders amongst women, to the extent that a major political party in the United Kingdom recently launched a campaign against the use of “size zero” models in marketing. Thus, even though most of the studies investigating possible effects of thin-ideal models employ cover stories and distracter tasks to hide the aims of the research, it seems plausible that many participants may feel that they are expected to negatively compare themselves to the images presented. It is not clear whether such demand characteristics would extend to studies, such as the present one, which employ ordinary women rather than professional models as comparison targets, but if they do not, this could explain the discrepancy in results under discussion.

As described in Section 3.1.3, the choice of ordinary women as comparison targets for Studies 2 and 3 was chiefly motivated by considerations derived from evolutionary theories of market value and intrasexual competition for mates (Pawlowski & Dunbar, 1999). Specifically, it was argued that the images employed represent individuals whom participants might realistically view as indicative of same-sex competitors in the mating market and so comparisons with these individuals should be clearly diagnostic of their own relative market value, and consequently affect their levels of self-esteem. However, it is possible that individuals are not concerned with assessing their standing

relative to “indicative” individuals, and instead respond only to comparisons with actual, real-world competitors in their local mating markets. This may explain the lack of a significant physical attractiveness contrast effect on self-esteem in the present studies. Participants may have assessed themselves as more or less attractive than the target images (as suggested by the significant contrast effect on self-reported attractiveness demonstrated in Study 3), but given that the target individuals were unknown to participants, and so could not represent actual competitors, this may not have affected participants’ self-perceived relative market value. This suggestion is supported by the results indicating a lack of significant contrast effects on self-perceptions of desirability as a sexual or marriage partner in the current study.

Such speculation accords with general criticisms of research on social comparison, which suggest that experiments that require individuals to compare themselves with targets whom they do not know do not capture real-world social comparative behaviour (Wood, 1996). Instead, Wood (1996) suggests that more studies should attempt to examine the spontaneous, real-world social comparisons which individuals make in everyday life. In the present context, this could involve conducting a diary study, in which individuals were asked to record their spontaneous attractiveness-based social comparisons with same-sex members of their immediate social group (who most directly represent competitors in the local mating market), and also record their contiguous feelings of self-worth. If positive correlations between downward, and negative correlations between upward, attractiveness comparisons and self-esteem were obtained, this would support sociometer theory.

4.4.3 Defensive Processing

A great deal of research on self-esteem has focused on how individuals seek to maintain and enhance positive views of themselves (see Sedikides & Gregg, 2008, for a recent review). Furthermore, evidence suggests that this self-enhancement motive is stronger than other motives for self-assessment and verification (Sedikides, 1993), and that it is pervasive across cultures (Sedikides, Gaertner & Vevea, 2005). Following this, it seems plausible that the lack of a significant attractiveness contrast effect on self-esteem in Studies 2 and 3 might be due to participants who were exposed to the highly attractive stimuli engaging in defensive processing to protect their feelings of self-worth in response to a negative upward social comparison.

An example of defensive processing is the strategy of compensatory self-enhancement, whereby individuals who have received negative feedback with respect to one trait, enhance their self-perceptions in relation to other positive attributes (Baumeister & Jones, 1978). Although these authors interpret this in relation to impression management strategies, subsequent research has suggested that compensatory self-enhancement may also serve to defend personal feelings of self-worth in the face of a threat to self-esteem (Jarry & Kossert, 2007). This presents the possibility that participants in Studies 2 and 3 who were subjected to upward attractiveness comparisons sought to defend their self-esteem by enhancing their self-perceptions in other areas. However, the pattern of obtained results does not support this, given that participants exposed to highly attractive images did not subsequently report higher levels of self-esteem on non-appearance related sub-scales (e.g. academic, athletic or social) than those who were subjected to downwards comparisons.

Another way in which individuals may defend their feelings of self-worth in response to unfavourable social comparisons is by minimising the relevance of the comparison targets (Tesser, 1988). For example, Stapel and Schwinghammer (2004) showed that upward comparisons with a moderately dissimilar other (a sociology versus psychology student) did not diminish participants' self-evaluations, but downward comparisons with the same target significantly enhanced positive self-perceptions. This pattern of results supports a defensive processing perspective whereby individuals may accept the relevance of comparison targets when the results of comparisons are favourable, but dismiss the relevance of targets who are superior to themselves. Such defensive processing may account for the lack of a significant physical attractiveness contrast effect on self-esteem in the current studies such that participants exposed to highly attractive others may simply have dismissed the comparison targets as irrelevant in an effort to protect their feelings of self-worth. In order to examine this, future studies could incorporate a control condition which would expose participants to neutral stimuli in place of images of others. Results indicating that participants in the control and upward comparison conditions did not differ in their subsequent levels of self-esteem, with those the downward comparison condition showing higher levels of self-esteem, would support this defensive processing account.

Recently, there has been discussion about the stage at which defensive processing occurs during social comparison processes. Traditional accounts of social comparison viewed it as a conscious and deliberative process whereby individuals made strategic decisions about their choice of comparison targets in an effort to gain personal insight, or to enhance self-evaluation (Wood, 1989). Thus, people were thought to defend their sense of self-worth largely by

choosing to compare themselves with others who were inferior on a particular trait or ability (Wills, 1981). However, more recent research has suggested that social comparison may be a largely automatic process which is not necessarily under conscious control (Stapel & Blanton, 2004, Blanton & Stapel, 2008). Thus Gilbert, Giesler and Morris (1995) suggest that individuals may make automatic, non-conscious, upward social comparisons and then subsequently engage in conscious defensive processing to undo the negative self-evaluative effects of these. Their study demonstrated that this defensive processing did not occur in individuals who were engaged in a distracter task, leading the authors to conclude that defensive processing may require significant cognitive resources.

Want (2009) proposed that automatic social comparison coupled with conscious defensive processing might explain the fact that studies of the effects of media images on body satisfaction typically show weaker physical attractiveness contrast effects when participants are instructed to specifically attend to the attractiveness of the images. Counter-intuitively, his meta-analysis demonstrates that studies which seek to distract participants from the attractiveness of target images (for example, by asking them to attend to the originality of the advert containing them) tend to report larger negative contrast effects on women's self-perceptions of attractiveness. Want (2009) suggested that these latter studies require individuals to process information unrelated to attractiveness, and that by demanding attention and cognitive resources, this may disrupt their ability to engage in defensive processing to ameliorate the negative effects of their automatic upward comparisons. In contrast, directing participants' attention towards processing physical attractiveness information, either by asking them to explicitly compare themselves with the targets, or to

rate the targets' attractiveness, may facilitate defensive processing, leading to less of a contrast effect.

These considerations may help to explain why the present studies did not demonstrate a physical attractiveness contrast effect on self-esteem. In Study 2, participants were required to rate the attractiveness of comparison targets, and in Study 3, directly compare their attractiveness to them. Following Want (2009), these instructions may have facilitated defensive processing in participants, allowing individuals in the hot condition to dismiss the relevance of the images to their own self-perceptions of attractiveness. In order to examine this, a laboratory study could be conducted in which participants are required to report on their thought processes in response to upward attractiveness comparisons. This might provide explicit evidence of specific defensive processing strategies, which are often inferred in the social comparison literature.

This defensive processing account may also explain the discrepancy between the current results and those of Brown et al. (1992) who demonstrated a physical attractiveness contrast effect on self-esteem, since their study required participants to consider a wide range of attributes of the target image which may have distracted their attention from attractiveness and thus detracted from defensive processing. Similarly, the study by Thornton and Moore (1993), discussed above, which demonstrated a physical attractiveness contrast effect on social self-esteem, exposed participants to pictures of highly attractive or unattractive others presented on posters which had ostensibly been left in the room as part of another study, and thus did not draw participants' attention toward attractiveness comparisons.

Recent studies have shown that automatic social comparisons can be produced by exposing participants to stimuli which are outside their conscious awareness (Stapel & Blanton, 2004; Blanton & Stapel, 2008). For example, Stapel and Blanton (2004) demonstrated that subliminally exposing participants to images of highly attractive or unattractive others produced contrast effects on both explicit and implicit self-perceptions of attractiveness. Future studies using this sub-conscious manipulation of self-perceived attractiveness and examining whether these subsequently affect self-esteem would be profitable in the context of the current research. Such sub-conscious manipulations have the advantage that they may prevent participants from engaging in defensive processing and also avoid limitations associated with demand characteristics and socially desirable responding. Blanton and Stapel (2008) conducted two studies in which they examined whether subliminally-presented highly attractive or unattractive images affected participants' levels of implicit self-esteem (as measured by the change in the size of their signatures from pre- to post-manipulation). Whilst both studies suggested that participants who had been exposed to highly attractive images showed lower subsequent levels of implicit self-esteem than those who had seen unattractive images, these results were only statistically significant in one of the studies. Thus further studies using both implicit and explicit measures of self-esteem are required to examine whether sub-conscious social comparisons of physical attractiveness can influence global feelings of self-worth, as predicted by sociometer theory.

4.4.4 Implications for Sociometer Theory

Despite the limitations discussed above, the present studies suggest that self-perceived attractiveness does not causally affect self-esteem, which is inconsistent with a sociometer interpretation of the relationship between these variables. The previous studies of attractiveness contrast effects on self-esteem discussed above also fail to consistently and convincingly demonstrate causal effects of self-perceived attractiveness on self-esteem in women. Each of these previous studies demonstrates that such effects can be obtained, but only under certain specific circumstances, and all of these studies also report non-significant results. Brown et al. (1992) demonstrated an attractiveness contrast effect on self-esteem in women only when comparison targets were presented as dissimilar. Similarly, Kowner and Ogawa (1993) demonstrated attractiveness contrast effects on the self-esteem of Japanese women only with dissimilar as opposed to similar comparison targets. Thornton and Moore (1993) demonstrated a physical attractiveness contrast effect on the specific domain of social self-esteem, but no effects on global self-worth. Thus, taken together, and contrary to the predictions of sociometer theory, the currently available evidence does not consistently demonstrate a causal effect of self-perceived attractiveness on feelings of self-worth. Furthermore, it seems surprising that so few published studies to date have sought to address this issue, given current popular concerns about the effects of media images on self-esteem. It may be the case that more studies have been conducted examining this question, but that these have obtained non-significant results and thus remain unpublished due to the “file drawer” problem (Rosenthal, 1979). Although this is highly speculative, it would support the current findings and argue against a simple

bottom-up sociometer interpretation of the relationship between self-perceived attractiveness and self-esteem.

The theoretical implications of the present and previous social comparison studies on the relationship between self-perceived attractiveness and self-esteem should be considered with caution. It may be the case that, partly for the reasons related to defensive processing described above, these manipulations of self-perceived attractiveness are simply not strong enough to cause detectable effects on self-esteem. Instead, false feedback paradigms of the kind more typically used to manipulate self-esteem (see Leary, Terry, Allen & Tate, 2009 for a recent review) might more powerfully affect participants' self-perceptions of attractiveness. For example, studies could be conducted in which photographs of participants are taken and ostensibly given to others to rate on attractiveness. False feedback could then be given to participants about their average ratings. Findings suggesting that individuals who had been led to believe that others found them highly attractive showed higher subsequent self-esteem than those who had been given negative feedback would support a sociometer perspective. Whilst such studies would potentially offer a more methodologically robust means of manipulating self-perceptions of attractiveness, they would also present significant ethical challenges.

In summary, currently available research provides only weak evidence that self-perceived attractiveness causally affects self-esteem and so it fails to convincingly support a *bottom-up* sociometer interpretation of the relationship between these constructs. This suggests the possibility that *top-down* theories of self-esteem (e.g. Brown, Dutton & Cook, 2001) might better explain this relationship. This possibility was examined in Study 4, which sought to

manipulate participants' self-esteem to see whether this affected their self-perceived attractiveness, as would be predicted by such top-down theories.

CHAPTER 5

STUDY 4: DOES MANIPULATING SELF-ESTEEM AFFECT SELF- PERCEIVED PHYSICAL ATTRACTIVENESS?

5.1.1 Introduction

In their exposition of sociometer theory, Leary and Baumeister (2000) suggested that self-esteem responds to both interpersonal acceptance and rejection, and social inclusion and exclusion. In addition, the theory suggests that the sociometer system should be sensitive to an individual's potential for being accepted and rejected (relational value), and so self-esteem should be sensitive to self-perceptions of traits that relate to this relational value. Leary and Baumeister (2000) reviewed evidence to support this prediction which suggests that self-evaluations in domains which are especially important in social relationships are strongly correlated with self-esteem (e.g. Pelham & Swann, 1989). Thus the theory suggests that specific self-evaluations causally affect global self-esteem in a bottom-up process. However, the correlations between specific self-evaluations and global self-esteem might also be explained by a top-down process, whereby global feelings of self-worth causally affect these self-perceptions.

This top-down explanation is favoured by Brown et al. (2001), who suggested that self-esteem develops early in childhood in response to relational and temperamental influences. These authors make a novel distinction between self-esteem and feelings of self-worth. They point out that traditionally, the latter term has been used to denote state self-esteem or transient feelings about the self, whereas self-esteem refers to an enduring trait or average of these

momentary states (e.g. Leary et al. 1995). However Brown and Dutton (1995) make a qualitative distinction between self-esteem and feelings of self-worth. For these authors, self-esteem represents a dispositional *capacity for maintaining* high feelings of self-worth rather than simply an enduring average of these. On this view, self-esteem performs an affect-regulatory function, whereby high self-esteem enables individuals to maintain high feelings of self-worth, particularly in the face of failure or interpersonal rejection. This view accords with a wealth of research on self-esteem maintenance mechanisms and the suggestion that the regulation of affect in response to threats to the self is responsible for a variety of defensive behaviours (Tesser, 2000). Brown et al. (2001) suggest that one of the ways in which feelings of self-worth can be regulated is through self-assessments in specific domains and so self-esteem is thought to exert a direct causal influence on these. Support for this view comes from a series of studies conducted by these authors which showed that individuals with high self-esteem are more likely to claim to possess high levels of a hypothetical trait if they have been lead to believe that it is particularly important. In contrast, the perceived level of importance had no effect on the self-ratings of participants with low self-esteem. Furthermore, Brown et al. (2001) showed that high self-esteem participants were more likely to claim that they possessed high levels of ambiguous traits (e.g. cautious, methodical) when they had been informed that these were socially desirable and following failure on a cognitive task. The authors suggested that this represents the self-esteem system attempting to maintain positive feelings of self-worth in response to failure. These studies constitute direct evidence that self-esteem may have a causal effect on self-evaluations (though the possibility remains that an underlying, correlated variable may explain these results).

In the context of the present research, this top-down model of self-esteem suggests that the observed correlations between self-perceived attractiveness and self-esteem discussed in Section 1.6 (e.g. Feingold, 1992) may reflect the fact that levels of self-esteem affect self-perceptions on this evidently desirable trait. Thus, individuals with high self-esteem might claim to be attractive as part of a general tendency towards positive feelings of self-worth (Brown et al. 2001). Such a view is consistent with research which shows that in women, self-esteem correlates more highly with subjective self-appraisals than with objective measures of attractiveness (Diener et al. 1995). Furthermore, research suggests that in women, personality traits and especially neuroticism are more predictive of self-evaluations of appearance than are others' ratings of their attractiveness (Brewer, 2009). Study 4 evaluated this causal hypothesis by attempting to manipulate participants' levels of self-esteem and examining whether this affected their subsequent levels of self-reported attractiveness.

5.1.2 Manipulating Self-Esteem

The majority of studies on self-esteem to date have focused on correlations between self-esteem and other variables and do not address the causal relationships between these (Mruk, 2006). However, a few experimental studies have attempted to manipulate self-esteem in order to assess its effects on other variables. Most of these studies use bogus feedback on either personality (e.g. Arndt & Greenberg, 1999) or cognitive ability tests (e.g. Ybarra, 1999) in order to temporarily manipulate participants' levels of self-esteem. However, there are several methodological problems with using such techniques. The first is that they do not directly manipulate self-esteem, but instead rely on manipulating the

participants' self-perceptions of a variable which then affects their level of state self-esteem. This makes them unsuitable for the present purposes of examining a causal link between self-esteem and self-evaluations of attractiveness: Using this method of manipulation would introduce a confound, since observed effects could be attributed either to changes in self-perceptions of the manipulated variable, or in state self-esteem. Furthermore, such false feedback methods have also been shown to affect mood (e.g. Forgas & Fiedler, 1996), which could introduce a further confound into the study; this is especially true given that experimental manipulations of mood have been shown to interact with self-esteem in affecting self-perceptions (Brown & Mankowski, 1993)

A related issue is that it seems likely that manipulating self-perceptions in a specific area (e.g. problem-solving ability) will affect global state self-esteem, but it is unclear how this will affect seemingly unrelated self-evaluations such as attractiveness. For example, being told that they have failed a cognitive task seems unlikely to negatively affect participants' reports of their attractiveness. In fact, evidence suggests that the opposite may be true. As discussed in section 4.4.3, Baumeister and Jones (1978) identified an effect whereby participants receiving negative feedback on certain personality traits rated themselves more favourably on other traits than did those who had received positive feedback. These authors labelled this effect "compensatory self-enhancement" and they ascribed it to a well documented general tendency of individuals to strive to maintain a positive self-image (see Tesser, 2004). In relation to the present study, an experiment by Jarry and Kossert (2007) attempted to manipulate women's levels of self-perceived attractiveness by exposing them to images of thin models and also provided participants with false feedback on an intellectual task which they were told was highly predictive of academic and professional

success. This study found that women who had been given negative false feedback on the intellectual task reported higher levels of appearance satisfaction than those who had been given positive feedback. Jarry and Kossert (2007) suggested that women in this study were attempting to compensate for a threat to their intellectual self-perceptions by perceiving themselves as more physically attractive.

The above considerations suggest that although false feedback methods which affect self-evaluations may be useful for investigating the effects of self-esteem on other variables such as worldview defence (Arndt & Greenberg, 1999) they are unlikely to be of use in investigating the effects of self-esteem on self-perceptions, as in the current study.

Another way in which studies have sought to manipulate state self-esteem is through the use of directed thinking paradigms. For example McGuire and McGuire (1996) asked participants to list either desirable or undesirable characteristics of themselves. Those who had listed desirable characteristics showed significantly higher subsequent levels of self-esteem than those who had listed undesirable traits. This method has the advantage that it is likely to incorporate a number of different domains of self-perception in manipulating global self-esteem. However, since it is still fundamentally based on manipulating the salience or accessibility of specific self-evaluations, it is likely to suffer from the same sorts of limitations as the false feedback methods described above. Moreover, this technique does not allow experimental control over the specific domains of self-evaluation which are activated and this could introduce further confounds. In the context of the present research, for example, if some participants chose to evaluate aspects of their appearance as part of

the self-esteem manipulation, then this could introduce a confound in studying the effects of self-esteem on self-perceived attractiveness.

A further limitation of both directed thinking and false feedback paradigms is that they are likely to introduce strong demand characteristics into the design of the experiment. Because both of these methods explicitly elicit positive or negative evaluations, it seems plausible that participants may be able to guess the aims of the study and act accordingly.

5.1.3 Implicit Manipulations of Self-Esteem

In response to the limitations of explicit manipulations of self-esteem discussed above, recent approaches to manipulating self-esteem have sought to use implicit methods to manipulate participants' global levels of self-esteem. This approach involves using priming techniques to subconsciously activate positive or negative global self-appraisals (Grumm, Nestler & von Collani, 2009). A study by Riketta and Dauenheimer (2003) was the first to investigate the possibility of using self-referential evaluative primes to manipulate self-esteem. Participants in this study were subconsciously presented with either positive (e.g. "I good", "I valuable") or negative ("I bad", "I worthless") self-referential primes as part of what they were led to believe was a simple reaction time task. In a series of experiments using this method, Riketta and Dauenheimer (2003) found that participants in the negative condition subsequently reported significantly lower scores on both a state (Heatherton & Polivy, 1991) and trait self-esteem scale (Fleming & Courtney, 1984) than those who were exposed to positive primes. Moreover, Riketta and Dauenheimer (2003) showed that the priming manipulation had no effect on participants'

mood. Finally, their fourth study showed that the manipulation also affected participants' levels of self-serving bias, a variable which has been reliably shown to co-vary with self-esteem (see Campbell & Sedikides, 1999). Importantly, participants in the Riketta and Dauenheimer (2003) study were completely unaware that their self-esteem had been manipulated, so it is unlikely that these results can be explained in terms of demand characteristics of the study. Moreover, instead of manipulating specific aspects of participants' self-concepts, as in the explicit manipulations discussed above, this method involved manipulating global self-evaluations.

A similar method to that of Riketta and Dauenheimer (2003) was used in a study of implicit manipulation of self-esteem by Dijksterhuis (2004). This study used an evaluative conditioning procedure whereby participants were subconsciously presented with the word "I" paired with positive trait terms. Relative to participants in the control condition, these individuals scored higher on three different measures of implicit self-esteem. Furthermore, this positive evaluative conditioning was shown to make participants insensitive to negative intelligence feedback. Thus, these results, together with those of Riketta and Dauenheimer (2003), strongly suggest that subconscious priming or conditioning methods can have powerful effects on participants' implicit attitudes towards themselves.

It is less clear, however, whether these implicit manipulations also affect explicit self-esteem. Riketta and Dauenheimer (2003) showed that their priming manipulation did affect both explicit state and trait self-esteem. However, a more recent study by Grumm et al. (2009) used the same evaluative conditioning procedure as Dijksterhuis (2004) and showed that this affected implicit but not explicit self-esteem, as measured by the state self-esteem scale

(Heatherton & Polivy, 1991). It is interesting to note that although Riketta and Dauenheimer (2003) refer to their method as priming, and Grumm et al. (2009) describe theirs as evaluative conditioning, they both use essentially the same method of subconsciously exposing participants to the self referent “I” paired with evaluative words. It is thus not clear why the results of these studies disagree over whether the manipulations solely affect implicit self-esteem (Grumm et al. 2009) or also affect explicit self-esteem (Riketta and Dauenheimer, 2003). One possible explanation is that the studies by Dijksterhuis (2004) and Grumm et al. (2009) used only positive evaluative conditioning, whereas Riketta and Dauenheimer (2003) compared participants who had been exposed to positive or negative primes. Thus, it may be the case that these implicit methods have a strong effect on implicit self-esteem but a much weaker influence on explicit self-esteem and this may have been detected by the more extreme approach of Riketta and Dauenheimer (2003).

5.1.4 Aims of Study 4

The studies described above suggest that it is possible to manipulate participants' levels of self-esteem without their conscious awareness of this by using priming or evaluative conditioning procedures. Such procedures offer a method of investigating whether global self-esteem causally affects self-perceived attractiveness, whilst avoiding the problems associated with explicit manipulations discussed above. Thus Study 4 used the self-esteem priming method developed by Riketta and Dauenheimer (2003) to examine whether this had an effect on participants' self-reported levels of facial attractiveness. From a bottom-up, sociometer perspective, manipulating self-esteem should have no

effect on self-perceptions of attractiveness. However, a top-down approach to self-esteem (Brown et al. 2001) suggests that manipulating self-esteem should affect subsequent self-evaluations of attractiveness. Specifically, participants who have higher levels of experimentally-induced self-esteem should report higher levels of self-perceived attractiveness than those who have been exposed to negative primes.

Furthermore, Study 4 further examined the reliability and validity of implicit approaches to manipulating self-esteem and evaluated whether such manipulations do in fact affect explicit self-reports of self-esteem. In particular, the implicit manipulation studies reported above were all conducted on German speaking participants. Whilst there seems no reason to believe that these participants should function differently from English speakers, Study 4 sought to establish the method as valid on an English speaking sample.

5.2 METHOD

5.2.1 Design

Female participants were randomly allocated to either a positive or negative self-esteem priming condition and were subsequently asked to report their level of global self-esteem and self-perceived facial attractiveness.

5.2.2 Participants

Seventy six native English speaking women between the ages of 17 and 50 (mean = 20.3, S.D. = 5.6) took part in the study. Participants were recruited from introductory psychology classes and departmental open days at the universities of Huddersfield and Central Lancashire. Participants were asked to take part in a study investigating the relationship between reaction times and physical attractiveness.

5.2.3 Apparatus and Materials

The stimuli for the priming manipulation and the subsequent questionnaire and facial attractiveness measures were constructed using E-Prime 1.4 experimental software and presented on 15 inch standard computer monitors running at a refresh rate of 60 Hz. Self-esteem was measured using the Rosenberg (1965) 10-item trait Self-Esteem Scale described in Section 2.2.2.2 above. Self-perceived facial attractiveness was measured using the Bale (2004) comparison measure of facial attractiveness described in Section 2.2.2.1.

5.2.4 Procedure

Participants were tested individually in sound-proof laboratory rooms. They were asked first whether English was their native or first language and all of the participants indicated that it was. They were informed that the study was investigating the relationship between reaction times and physical attractiveness. They were told that the first part involved identifying whether each of a series of flashes appeared on the left or right hand side of a cross in the centre of a computer screen. If they thought the flash was on the left of the screen, they should press the “z” key on the keyboard and if they thought it was on the right, they should respond by pressing the “m” key. Participants were informed that in order to respond as quickly as possible, they should keep focusing on the cross in the centre of the screen. They were told that the study would not move on until they had responded, and so if they had not seen a flash for a while, they had probably missed one and should just guess at a response. Participants were told that they would then be asked to answer a few questions about how they were feeling and then compare their level of facial attractiveness to a series of pictures of men and women using the number key corresponding to their chosen response on the scales provided on screen. After answering any questions the participants had, and confirming their consent, the experimenter positioned the participant so that her eyes were 50 cm from the computer screen. Participants were asked to remain at this distance from the screen for the duration of the study, and were told that otherwise the study would not work. The experimenter then left the room. Participants read an on-screen version of the verbal instructions given above and then proceeded to the

priming manipulation (or reaction time test to their knowledge) by pressing a key.

The priming procedure was exactly the same as that used by Riketta and Dauenheimer (2003) except that the self-referent and positive and negative words were English instead of German. The basis of this technique is that priming words are presented parafoveally (between 2° and 6° of visual angle) for durations shorter than minimum eye movement latency (see Bargh, Raymond, Pryor & Strack, 1995). Participants are therefore unable to consciously perceive the words, but these are nevertheless registered subconsciously. In each trial, participants first saw a fixation point (black cross) in the centre of a white screen for either 1000, 1500, 2000 or 2500 ms, as specified by the delay parameter for the trial. This was followed by either a positive or negative self-esteem prime (dependent on the condition) which was displayed in black against a white screen for 60 ms. Primes in the positive condition consisted of the words "I GOOD", "I GREAT" or "I VALUABLE", whereas negative primes were "I BAD", "I LOUSY" or "I WORTHLESS". The primes appeared in one of four positions (top left, top right, bottom left, bottom right) on the screen in relation to the position of the fixation point (i.e. the centre of the display) at a distance of 2.5cm. Thus primes were displayed to participants at a visual angle of 2.9° which has been shown to be within the parafoveal area of visual perception (Bargh et al. 1995). The prime was then replaced in the same position by a mask consisting of a random string of eight black consonants (e.g. WDGHTBFL) which was displayed for 60 ms. The fixation point then reappeared whilst participants responded, using the "z" or "m" key indicating which side of the screen they thought the "flash" had appeared on. As soon as the participant responded, there was a delay of 500ms whilst the

fixation point disappeared before the next trial began. The three primes were displayed once in each of the four positions and for each of the four delay periods, producing 48 trials in an experimental block. There were two blocks so that each participant underwent 96 trials in total. The order of trials within each block was randomised by the computer for each participant.

Following the reaction-time test, participants completed the Rosenberg (1965) Self-esteem Scale. They were asked to use the number keys on the keyboard to select a response which best represented their feelings towards the statements in the scale. Each item, together with the response scale (1 – *Strongly agree* to 4 – *Strongly disagree*) appeared on a separate page and as soon as participants responded, the next statement was displayed.

Having completed the self-esteem scale, participants then completed the self-perceived attractiveness measure (Bale, 2004). They were asked to compare their attractiveness relative to the faces displayed using the number keys from 1 to 7, with higher numbers representing feeling more attractive, and lower numbers indicating feeling less attractive, for each picture. Each comparison image was displayed on a separate page together with the response scale (1- *My face is much less attractive* to 4 – *My face is equally attractive* to 7 – *My face is much more attractive*). As soon as the participant responded the next page was displayed. For details of the scoring procedure for this measure, see Section 2.2.2.1.

Having completed the facial attractiveness comparison measure, participants were asked to indicate to the experimenter that they had finished the study. They were then debriefed. The experimenter asked the participant how she was feeling after the study. No participants reported feeling any different from how they had felt at the beginning of the study. The experimenter

then asked the participant what she thought the “flashes” consisted of. All participants reported that they had seen “words” or “letters” but none reported being able to identify any specific words. The experimenter then fully explained the aims, background and methods of the study and informed each participant of which condition they had taken part in. Participants were asked to confirm that they consented for their data to be used in the analysis, and those who had taken part in the negative condition were given the opportunity to then take part in the positive condition (though no data was recorded if they chose to accept this opportunity). Participants were then thanked and dismissed.

5.3 RESULTS

Table 21 displays the means and standard deviations of self-esteem and self-perceived physical attractiveness scores for both the positive and negative priming groups.

Table 21:

Priming Effects on Self-Esteem and Self-Perceived Attractiveness.

Priming Group	Self-Esteem			Self-Perceived Attractiveness		
	N	Mean	S.D	N	Mean	S.D
Positive	33	3.08	.40	38	4.79	.81
Negative	34	2.84	.57	38	4.45	.97

In order to ascertain whether the priming technique affected participants' subsequent levels of self-esteem, participants' scores on the SES were compared between priming groups. A one-tailed independent samples t-test revealed that participants in the positive priming condition reported significantly higher post-manipulation levels of self-esteem than those in the negative condition ($t(65) = 2.03, p < .05$). A Cohen's d calculation revealed this to be a moderately-sized effect ($d = .50$) (Cohen, 1988, cited in Faul et al. 2007). These results indicate that the priming technique employed had a significant effect on participants' subsequent levels of self-esteem.

In order to test the hypothesis that manipulating participants' levels of self-esteem would have an effect on their levels of self-reported attractiveness the two priming groups were compared on this variable. A one-tailed, independent samples t-test revealed that participants in the positive condition reported significantly higher levels of self-perceived attractiveness than those in the negative condition ($t(74) = 1.63, p < .05$). A Cohen's d calculation revealed this to be a weak to moderately-sized effect ($d = .39$). This supports the hypothesis that manipulating participants' levels of self-esteem would affect their self-perceptions of attractiveness.

5.4 DISCUSSION

The results of Study 4 indicate that sub-consciously manipulating women's global feelings of self-worth affects their subsequent levels of self-perceived physical attractiveness. These results support top-down perspectives on self-esteem, which imply that it causally affects specific self-evaluations (Brown et al. 2001). Moreover, the present results demonstrate the validity of employing the self-esteem manipulation devised by Riketta and Dauenheimer (2003) on an English speaking sample. This paradigm could be profitably employed to investigate causal relationships between self-esteem and a wide variety of other variables (see below), and so the present study contributes to the development of a potentially valuable research tool for the investigation of self-esteem. The present results also demonstrate that sub-conscious manipulations can affect explicit self-esteem, in contrast to previous research, which suggests that such treatments only affect implicit self-esteem (Grumm et al. 2009). As discussed above, it is possible that these subconscious manipulations have stronger effects on implicit as opposed to explicit self-esteem. The present paradigm, following Riketta and Dauenheimer (2003) and employing both positive and negative primes, may have stronger effects than other previous studies which have used only positive primes (Dijksterhuis, 2004; Grumm et al. 2009). This might explain why the present approach significantly affected explicit self-esteem, whereas the paradigm employed by Grumm et al. (2009) did not. In order to investigate this, future studies using the present paradigm could include a baseline condition, designed to neither increase nor decrease self-esteem, and compare subsequent levels of both implicit and explicit self-esteem between this condition and the positive and negative conditions employed here.

Previous studies used the self-referent “I” paired with neutral words (e.g. “chair”; Dijksterhuis, 2004) or non-words (Grumm et al. 2009) as primes in the control condition, and showed that participants in this condition scored lower on implicit measures of self-esteem than those in the experimental condition, which used self-referential positive words (e.g. “warm”, “positive”). Future studies could examine whether participants in the present negative priming condition report lower levels of implicit self-esteem than those in such control conditions. If this were the case, it would indicate that sub-conscious manipulations can be used to both experimentally increase and decrease levels of implicit self-esteem. Similarly, although the results of Grumm et al. (2009) suggest that positive primes do not increase levels of explicit self-reported self-esteem relative to controls, future studies should examine whether negative primes decrease this. If this were found to be the case, it would support the explanation for the discrepancies in the literature described above. Elucidating the specific effects of both positive and negative priming procedures on both explicit and implicit self-esteem would provide researchers with powerful experimental tools for examining causal hypotheses in this area.

Nonetheless, the present findings should be treated with some degree of caution. It is possible that, although participants were randomly allocated to conditions, by chance more attractive participants with higher pre-existing levels of self-esteem were assigned to the positive experimental condition. Due to the fact that participants’ levels of self-perceived attractiveness and self-esteem were not measured before exposure to the manipulation, this possibility cannot be assessed. However, given that participants were randomly allocated to experimental conditions, there is no reason to suspect this was the case.

It would seem sensible to administer the same measures of self-esteem and self-perceived attractiveness both before and after the manipulation. This would allow an examination of possible allocation-biases and also provide more powerful data in that a change score from pre- to post- exposure could be calculated for each individual participant. However, such an approach would also present significant difficulties. From the point of view of the participants, this design would require them to complete measures of self-esteem and self-perceived attractiveness, engage in a “reaction time” test, and then complete exactly the same measures. It seems likely that this would induce considerable suspicion in participants and bring with it attendant demand characteristics. Furthermore, it seems equally probable that when completing the post-exposure measures participants will remember and simply repeat their earlier responses, thus extinguishing any possible manipulation effects. This seems especially likely in the case of the Rosenberg (1965) self-esteem scale, which consists of just 10 items with four point response scales, and for these reasons this approach was not employed in the present study.

A compromise approach might be to replicate the present study and administer different pre- and post-exposure measures of self-esteem and self-perceived attractiveness. If the results showed significant differences between experimental groups on post-exposure, without corresponding significant differences in pre-exposure measures, it would suggest that the manipulation does genuinely affect both self-esteem and self-perceived attractiveness. However, such studies may still suffer from demand characteristics following from measuring the same variables twice.

Using implicit measures of both self-esteem and self-perceived attractiveness would have the advantage of avoiding demand characteristics. A

particularly promising method for measuring both implicit self-esteem and physical attractiveness is the Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, 1998), which uses categorisation response latencies to infer the strength of subconscious associations between concepts. The IAT can be used to examine implicit self-esteem by comparing response latencies to self- concepts and non-self concepts paired with positive and negative attributes (Greenwald & Farnham, 2000). The self-esteem IAT demonstrates acceptable levels of internal consistency and test-retest reliability and predicts other raters' impressions of self-esteem (Bosson, Swann & Pennebaker, 2000). It has been used in several studies in a variety of cultures to investigate implicit self-esteem (Szeto et al, 2009). Although to date, the IAT has not been used to examine self-perceptions of attractiveness, it could be adapted for this by comparing response latencies for self- and non-self concepts paired with attributes concerning high (e.g. "beautiful", "attractive") and low attractiveness (e.g. "ugly", "unattractive").

These issues also have important implications for the existing literature on experimental manipulations of self-esteem and related constructs. The majority of studies which seek to manipulate self-esteem using, for example false feedback methods, do not measure self-esteem before the manipulation (e.g. Arndt & Greenberg, 1999, Ybarra, 1999) and so suffer from the same limitations in terms of interpreting post-manipulation group differences as the current study. Such problems of interpretation may be especially problematic in light of the file-drawer problem, whereby studies showing significant experimental effects are more likely to be published than those with non-significant results (Howard et al, 2009). Where relevant variables have not been measured both pre- and post-manipulation, it is possible that published studies showing

significant effects of manipulations represent a small proportion of the total studies conducted (the majority of which show non-significant effects and go unpublished), in which bias in the allocation of participants to conditions has occurred, producing type I errors. Such issues highlight the difficulty of balancing often competing concerns surrounding, for example, experimental rigour and demand characteristics, and may help to explain why the majority of the research literature on self-esteem is correlational in nature.

Including pre-manipulation measures of self-esteem in future studies would not only help to avoid problems of interpretation of results, but would also allow for the examination of whether the manipulation differentially affects participants with pre-existing high versus low levels of self-esteem. A number of studies have shown that participants with higher levels of self-esteem are more resistant to the negative effects of explicit manipulations designed to diminish feelings of self-worth (e.g. Brown & Dutton, 1995; Brown & Marshall, 2001). Such studies support top-down theories of self-esteem, which posit that self-esteem functions to regulate negative affective responses to failure and rejection (Brown & Dutton, 1995). However, to date, no studies have examined whether individuals with higher pre-existing levels of self-esteem are more resistant to implicit, sub-conscious, negative manipulations of self-esteem, such as those employed in the negative condition of Study 4. Future studies examining this could help to reveal the mechanism by which high self-esteem serves to protect feelings of self-worth. If individuals with high pre-existing levels of self-esteem suffer similar decreases in feelings of self-worth in response to implicit negative manipulations as those with low self-esteem, this might indicate that conscious defensive processing mechanisms are responsible for self-esteem level effects in the explicit manipulation literature. If this were the

case, it would be assumed that implicit manipulations simply bypass such conscious defensive mechanisms. This would accord with research reported in Section 4.4.3, which suggests that sub-conscious exposure to upward social comparisons may bypass defensive processes which normally occur during conscious comparisons (Gilbert et al. 1995). If, however, individuals with high self-esteem are equally resistant to both implicit and explicit negative manipulations of self-esteem, this implies that the self-protective effects of high self-esteem work on a deeper, sub-conscious level, or more simply that high self-esteem is resistant to any kind of change.

It should be noted that the results from the current study are not explicitly predicted by sociometer theory, but they are not necessarily incompatible with it. Sociometer theory predicts that self-perceptions of attractiveness causally affect self-perceptions of relational desirability, which affect self-esteem. This does not, however, preclude the possibility that there may be a circle of influence, whereby global feelings of self-worth can exert a causal effect on specific self-evaluations, including those of attractiveness. This may be especially likely to happen in situations, such as the present one, where global feelings of self-worth have been sub-consciously manipulated. In everyday life, individuals are more likely to encounter situations that affect their specific self-evaluations through processes such as social comparison, acceptance and rejection and success and failure, than they are to experience situations which directly affect their global feelings of self-worth. This is why it is difficult to directly manipulate global self-esteem experimentally (see Section 5.1.2). The sociometer system may simply work by facilitating associations between positive and negative evaluative experiences and corresponding global feelings of self-worth. Such associations are assumed to be bi-directional (this is the

basis of both priming and implicit association methods). In the present situation, implicitly-induced changes in global self-esteem may activate changes in specific self-evaluations of attractiveness via connections initially built by the sociometer mechanism.

Following this, it would be interesting to conduct further studies examining whether the present sub-conscious manipulation of global self-esteem can affect self-evaluations in areas other than facial attractiveness. For example, as previously discussed, women's self-perceptions of attractiveness also encompass wider issues of body image and especially weight (Grogan, 1999). It would be interesting to examine whether participants exposed to negative self-esteem primes subsequently report lower scores on the body esteem scale (Franzoi & Shields, 1984) than those in the positive condition. Similarly, studies have demonstrated that women tend to significantly overestimate the size of their lower bodies (Thompson, Penner & Altabe, 1990) and that self-perceptions of weight predict self-esteem in women (see Miller & Downey, 1999 for a meta-analytic review). Future studies could profitably examine whether the current manipulation affects women's estimates of their body size and weight. Findings indicating that participants exposed to positive self-esteem primes overestimate their weight and size less than controls could have implications for the treatment of individuals with distorted body images. It would also be profitable to examine whether the current manipulation affects self-perceptions of attractiveness and body image in men. Given that self-esteem is less strongly related to physical attractiveness in men (Feingold, 1992, and see Study 1) it may be the case that manipulating the former variable has little effect on the latter. From a sociometer perspective, this would follow from the fact that romantic desirability is less dependent on physical attractiveness in men than in women (e.g. Buss, 1989).

In a similar vein, future studies could examine whether there are other sex differences in the extent to which implicit global manipulations of self-esteem affect a variety of traits related to romantic and sexual desirability. For example, the mate-value inventory (MVI; Kirsner, Figueredo & Jacobs, 2003) which measures global self-perceptions of romantic desirability together with specific aspects such as health, ambition, earning potential and kindness, could be employed. It might be predicted that global manipulations of self-esteem will affect overall self-perceptions of mate value equally in both sexes, but the pattern of effects on specific aspects of this may differ between men and women. If the results indicated that manipulations had more effect on self-perceptions of traits relating to social status, ambition and industriousness, and earning potential in men, and greater effects on self-perceptions of attractiveness in women, it would support a sociometer perspective, in that the relationship between self-esteem and specific traits should reflect the importance of these traits in securing mates (Kirkpatrick & Ellis, 2004). On a more general level, sociometer theory might also predict that global manipulations of self-esteem should affect self-perceptions of social inclusion and acceptance, and the quality of existing social relationships in individuals of both sexes.

It would also be interesting to examine whether specific contingencies of self-worth (Crocker & Wolfe, 2001) mediate any effects of manipulating global self-esteem on specific self-evaluations. Crocker and Wolfe (2001) argued that individuals base their self-esteem on different areas or contingencies, including approval of others, appearance, competition, family support, God's love, competence and virtue. This model assumes that positive perceptions and evaluations in these domains lead individuals to experience greater self-

esteem. However, from a top-down perspective on self-esteem, it is possible that global self-esteem may affect self-evaluations in these domains of contingency. Thus, future studies could administer the contingencies of self-worth scale (CSWS; Crocker et al. 2003) to examine whether there is a relationship between individuals' contingencies of self-worth and the effects of global manipulations of self-esteem on specific domains of self-perception and evaluation. For example, individuals who score highly on the competence subscale of the CSWS may experience greater decreases in self-perceptions of competence in response to a negative self-esteem manipulation than those who score low on this contingency.

The present study adopted the method of Riketta and Dauenheimer (2003) in using general positive and negative primes (e.g. "good", "worthless") to manipulate global self-esteem. This contrasts with other implicit manipulations employing evaluative conditioning methods, which use a number of more specific traits (e.g. "strong", "beautiful", "kind") to increase global self-esteem (Dijksterhuis, 2004; Grumm et al. 2009). It would be interesting to use the current priming procedure with specific trait terms to attempt to manipulate specific domains of self-esteem or self-evaluation in order to test causal hypotheses. For example using words relating specifically to physical attractiveness (e.g. "beautiful", "ugly") as primes, the current method might be used to implicitly manipulate self-evaluations of attractiveness in order to examine whether this affects global self-esteem. This would offer an alternative method of examining the research questions of the current Studies 2 and 3, and may be advantageous in terms of avoiding some of the issues concerning explicit manipulations discussed in Section 4.4. Similar methods could also be used to test further hypotheses derived from sociometer theory. For example, it

might be possible to implicitly manipulate participants' self-evaluations of their social status, ambition and industriousness using primes such as "successful", "poor" and "lazy". Given that these traits are more strongly related to romantic desirability in men than women (Buss, 1989), it might be expected that such manipulations would have stronger effects on global self-esteem in men than in women.

Study 4 further demonstrates the utility of using sub-conscious methods to manipulate individuals' self-esteem and suggests that this also affects self-perceptions of attractiveness in women. This supports top-down theories of self-esteem which hold that observed correlations between self-esteem and specific self-evaluations are best explained by a causal influence of the former on the latter (Brown et al. 2001). It also opens up a wealth of further possibilities for investigating causal hypotheses about the nature and function of self-esteem. Furthermore, if self-esteem can be directly manipulated, as this and prior studies suggest, it might even be possible to use such methods in interventions designed to increase individuals' levels of self-esteem, which has long been of concern to researchers in the field (Mecca, Smesler & Vasconcellos 1989; Mruk, 2006).

Part of the motivation for employing such self-esteem interventions stems from the belief, common in the literature, that self-esteem affects individuals' behaviour. Leary and Baumeister (2000) posit that the sociometer system serves to regulate individuals' interpersonal relationships, and so their theory predicts that self-esteem should exert a causal influence on social behaviour. Study 5 examined this prediction by assessing the relationship between self-esteem and relationship behaviour in women.

CHAPTER 6

STUDY 5: DOES SELF-ESTEEM INFLUENCE RELATIONSHIP BEHAVIOUR?

6.1.1 Introduction

According to sociometer theory (Leary & Baumeister, 2000), self-esteem is an evolved psychological adaptation designed to monitor individuals' interpersonal relationships. For any trait to evolve, there must be a selective pressure such that certain genes affect traits which increase the probability that they will be propagated in subsequent generations (Dawkins, 1976). Thus, for psychological adaptations to evolve, they must confer some sort of selective advantage on the individuals that possess them. This implies that for the sociometer system to represent a psychological adaptation, it must, in some way, have affected the *behaviour* of individuals, and that this behaviour was adaptive, at least in the ancestral Environment of Evolutionary Adaptedness (EEA: Tooby & Cosmides, 1990). This analysis implies that if the sociometer system represents a psychological adaptation, it should influence the behaviour of modern humans.

Leary and Baumeister (2000) allude to this evolutionary argument, by suggesting that the sociometer not only monitors relationships, but also has a regulatory function. According to sociometer theory, individuals who perceive their relational value to be low experience low self-esteem. This leads to a negative affective reaction, which motivates the individual to take action. It follows that individuals with low self-esteem should engage in behaviour which is designed to increase their relational value. However, Leary and Baumeister

(2000) present little evidence to suggest that self-esteem has any causal effect on behaviour. In fact, the evidence they present to link behaviour with self-esteem exclusively focuses on how low self-esteem is linked to negative behaviour such as alcohol and drug abuse and antisocial behaviour (see Mecca et al. 1989). Leary and Baumeister (2000) suggest that these are maladaptive responses to the negative affect caused by the sociometer system, but they do not offer any examples of adaptive responses. This lack of evidence of adaptive behaviour in response to the sociometer potentially challenges the notion that it is a psychological adaptation and represents a significant gap in the theory. Thus, the present chapter examines how self-perceptions of attractiveness relate to self-esteem and specific forms of behaviour designed to help maintain romantic relationships in women.

6.1.2 Self-Esteem and Behaviour

The vast majority of research into the behavioural correlates of self-esteem has focussed on its association with various forms of negative behaviour, such as crime and antisocial conduct, teen pregnancy, drug and alcohol abuse, and educational underachievement (for a review, see Mecca et al. 1989). Such studies often produce conflicting results, such that the association between levels of self-esteem and various forms of behaviour is weak and inconsistent (Baumeister, Campbell, Krueger & Vohs, 2003). A good example of this is the relationship between self-esteem and aggression. It is often assumed that individuals with low self-esteem are more likely to behave violently (e.g. Mecca et al. 1989). However, research suggests that this may not be the case, and indeed, it is often individuals with very high levels of self-reported self-esteem

who show the highest levels of aggression in laboratory studies (Bushman et al, 2009). Baumeister, Smart and Boden (1996) suggested that it is not level of self-esteem *per se* which predicts violence, but instead *threatened egotism*. Thus, they suggested that people often react aggressively when their favourable self-views are challenged by others. Support for this contention comes from studies which show that individuals with high trait levels of self-esteem often react to ego threats by devaluing others (e.g. Bushman et al, 2009).

This research links to a sociometer perspective on differing motivations of individuals with high versus low levels of trait self-esteem. According to sociometer theory, low self-esteem results from chronic deficits in individuals' perceptions of their social inclusion and interpersonal desirability (Leary & Baumeister, 2000). Hence, people with low levels of trait self-esteem should be especially motivated to monitor and enhance their relational status or sense of belonging, and research does indeed suggest that self-esteem is negatively related to expressed needs for affiliation (Rudich & Vallacher, 1999). In contrast, individuals with relatively high levels of self-esteem do not suffer from such relational deficits and so seem to be more motivationally concerned with protecting and enhancing their superior feelings of self-worth (See Blaine & Crocker, 1993 for a review). Accordingly, Rudich and Vallacher (1999) demonstrated that, in their choice of an interaction partner, people with low self-esteem valued evidence that another individual had a desire to pursue a relationship with them more highly than receiving positive personality feedback from that individual. In contrast, individuals with high self-esteem preferred a partner who provided them with positive personality feedback, and placed less emphasis on cues to social acceptance. Further evidence for the motivational

effects of self-esteem is provided by a study by Vohs and Heatherton (2001), who showed that following an ego-threat, individuals with high self-esteem sought feedback on their competency and construed themselves as more independent, whereas those with low self-esteem preferred interpersonal feedback and emphasised interdependence.

Furthermore, and importantly for an adaptive perspective on the sociometer function of self-esteem, studies have suggested that motivational differences between individuals with high versus low levels of self-esteem might be reflected in their interactional behaviour. For example, Heatherton and Vohs (2000) showed that individuals with low self-esteem were perceived as more likable by an interactional partner following a non-relational ego threat. They suggest that since individuals with low self-esteem may automatically link the concepts of personal failure and rejection (Baldwin & Sinclair, 1996) low self-esteem participants who received the ego-threat may have been motivated to make efforts to repair their sense of inclusion by behaving in an especially relationally-enhancing manner, relative to controls. Heatherton and Vohs (2000) also found that individuals with high self-esteem were perceived as less likable after receiving an ego-threat; their analysis suggested that this effect may have been at least partly explained by greater levels of antagonistic behaviour towards the interactional partner in these participants. Similarly Vohs and Heatherton (2001) demonstrated that the relationship between self-esteem and likability in ego-threatened participants is mediated by the extent to which they emphasise their independence versus interdependence. Specifically, individuals with high self-esteem respond to an ego-threat by emphasising their independence and are subsequently perceived as less likable, whereas those

with low self-esteem emphasise their interdependence, and this leads them to be more positively evaluated by others.

A subsequent study by these authors suggested that these effects may also be partially mediated by social comparison processes (Vohs & Heatherton, 2004). Specifically, individuals with higher levels of trait self-esteem were shown to be more likely to use downward social comparisons to protect their sense of self-worth in response to an ego threat, and this led others to perceive them as less likeable than both low self-esteem participants and controls. In comparison, low self-esteem participants demonstrated upward social comparisons in response to the ego threat, seemingly protecting their social standing at the cost of failing to repair their sense of self-worth. This research supports a sociometer perspective by highlighting differences in the level of social motivation in individuals with high versus low self-esteem, and by demonstrating that the resultant behaviour of the latter may have adaptive consequences in terms of improving their relational status.

Kirkpatrick and Ellis (2004) suggested that one way in which self-esteem might adaptively regulate interpersonal behaviour would be through influencing people's decisions about whom to pursue relationships with. From an evolutionary perspective, people should attempt to seek the highest quality social partners available, whilst avoiding wasting time and resources pursuing partners who are unlikely to accept them (e.g. Pawlowski & Dunbar, 1999). Hence, Kirkpatrick and Ellis (2004) suggested that the sociometer system might link self-assessments of relational value with adaptive choices about relational targets, through the mediating influence of self-esteem. The study by Kavanagh et al. (2010) described in Section 3.1.1 sought to provide evidence to support this suggestion. As part of what was ostensibly a dating study, participants

received either accepting or rejecting feedback about their desirability as a date from an attractive confederate of the opposite sex. They were then asked to complete a measure of *mating aspirations* which involved indicating how compatible or well matched they felt they were with target individuals of the opposite sex who differed in terms of their mate value. The results showed that participants who had received rejecting feedback felt significantly more compatible with low mate-value targets compared to those who had received accepting feedback. Conversely, participants in the acceptance condition rated themselves as being significantly more compatible with high mate-value targets than did those in the rejection condition. These effects were mediated by changes in self-esteem in response to acceptance or rejection. Kavanagh et al. (2010) interpreted these results as demonstrating that participants were adaptively regulating their relational aspirations in response to interpersonal feedback and thus argued that this supported a sociometer perspective on the function of self-esteem. However, an alternative explanation for these results is that their measure of mating aspirations was in fact simply measuring self-perceptions of market value or desirability, since it did not assess participants' decisions about whom to pursue as relational partners.

This issue relates to a more general limitation of the previous studies described here in that they assess the relationship between self-esteem and individuals' behaviour towards strangers in laboratory contexts. Whilst interactions with strangers are doubtlessly important, from an evolutionary point of view, their significance is slight when compared with intimate relationships with actual sexual and romantic partners (see Chapter 1). Thus, if self-esteem is a psychological adaptation, as sociometer theorists suggest (Leary &

Baumeister, 2000), it should affect the way in which individuals interact with their romantic partners.

6.1.3 Self-Esteem in Romantic Relationships

Much of the early research into self-esteem in romantic couples focused on simple relationships between self-esteem and relational variables such as love styles and relationship satisfaction (e.g. Hendrick et al. 1988). Such research often adopted the standard assumption that possessing high self-esteem facilitated the formation and maintenance of satisfying relationships, but the exact causal mechanisms involved remained largely unexplored (Baumeister et al. 2003).

However, recently Murray and colleagues have developed the *dependency regulation model*, which seeks to explain differences in how individuals with high versus low levels of self-esteem approach their romantic relationships (see Murray, Holmes & Collins, 2006 for a review). The dependency regulation model shares the assumption of sociometer theory that individuals with low self-esteem perceive themselves to be relatively undesirable as partners and have unmet needs for interpersonal inclusion and acceptance (Leary & Baumeister, 2000). This leads them to be especially sensitive to signs of rejection and to suffer greater negative affective and self-evaluative consequences when they are rejected by others (Nezlek et al. 1997). Murray et al. (2006) point out that rejection by a close romantic partner is likely to be especially painful, and research suggests that individuals who are low in self-esteem experience significantly greater negative effects in response to the dissolution of a romantic relationship than do those with high self-esteem (Chung et al, 2002). Thus,

according to Murray et al. (2006) people with low self-esteem are presented with a dilemma in that they desperately seek the relational closeness provided by intimate romantic relationships, but are simultaneously especially fearful of being rejected (see Anthony, Wood & Holmes, 2007 for similar arguments and evidence in relation to more general social relationships). The dependency regulation model suggests that individuals with low self-esteem may attempt to protect themselves from the negative consequences of rejection by emotionally distancing themselves from their partners when they perceive the likelihood of rejection to be high. Ironically, they suggest that these reactions may increase the likelihood of these individuals actually being rejected by their partners, thus forming a self-fulfilling prophecy (see Downey, Freitas, Michaelis & Khouri 1998, for evidence suggesting that rejection-sensitivity in women predicts actual rejection by their partners).

A series of studies by Murray and colleagues support this dependency regulation model. Their research suggests that individuals with low levels of self-esteem underestimate the extent of their partners' love and positive regard for them (Murray, Holmes & Griffin, 2000; Murray, Holmes, Griffin, Bellavia & Rose, 2001) and consider themselves to be inferior to their partners on a range of interpersonal qualities (Murray et al, 2005). They are also more likely to interpret their partners' negative moods of ambiguous cause as being their fault, and to feel rejected as a result (Bellavia & Murray, 2003). Moreover, individuals with low self-esteem tend to see their partners' love and regard as contingent on their success and so feel less accepted by their partners when they are subjected to a non-relational ego threat (Murray, Bellavia, Feeney, Holmes & Rose, 2001). This finding is in accord with research that demonstrates that individuals with low self-esteem automatically associate failure with

interpersonal rejection (Baldwin & Sinclair, 1996). All of this supports the view that people with low levels of self-esteem are hyper-sensitive to the possibility that their partner might reject them.

Furthermore, and in line with a dependency regulation perspective, research also suggests that people may react to such expectations of rejection by attempting to psychologically distance themselves from their partners. For example, Murray, Holmes, MacDonald and Ellsworth (1998) exposed participants to a variety of experimental manipulations designed to threaten their feelings of self-worth. Individuals with low levels of trait self-esteem typically reacted to such threats by both doubting their partners' positive regard and also evaluating their partners more negatively. The authors interpret this latter result as evidence that these individuals were trying to decrease the value of their relationships and thus buffer themselves from the negative psychological consequences of their possible dissolution. In contrast, participants with high levels of self-esteem responded to threats by increasing their feelings of acceptance by their partners and thus used their relationships as a resource to help protect their feelings of self-worth. Similarly, Murray, Rose, Bellavia, Holmes and Kusche (2002) led individuals to believe that their partners, who were physically present, perceived some minor problem with their relationship or perceived an excessive number of negative traits in them. Participants with low levels of self-esteem reacted by perceiving that their partners' affection and commitment might be diminishing, and this led them to both derogate their partner and reduce their sense of closeness to them. In contrast, individuals with high levels of self-esteem either maintained or even increased their positive evaluations of their partners in the face of such threats.

These studies demonstrate that people with low levels of self-esteem may often respond to threats to their relationships by emotionally distancing themselves from their partners, and diminishing their positive perceptions of them. These results challenge the adaptive perspective of sociometer theory by suggesting that instead of being motivated to enhance their relational standing in response to personal and relational threats, individuals with low self-esteem may in fact respond in ways which damage their romantic relationships. However, none of the studies detailed above actually measured people's behaviour towards their partners in response to relational or personal threats. It is therefore unclear whether these affective and evaluative responses lead to maladaptive behaviour, or whether they increase the likelihood of relationship dissolution.

To date, only a few studies have examined behavioural responses to relational threats in romantic couples. Murray, Bellavia, Rose and Griffin (2003) conducted a diary study in which they asked individuals in couples to report their self-esteem and the extent to which they felt positively regarded by their partner. They were then asked to submit daily reports on spousal conflicts, together with their feelings of closeness towards their partner and their own and their partners' mood and positive (e.g. expressions of love, behavioural accommodation) and negative (e.g. insulting, selfish) relationship-oriented behaviour. The results showed that people who chronically felt less positively regarded by their partners responded to threats to their relationships (as indexed by conflict, partners' negative moods and rejecting behaviours) by behaving more negatively towards their partners on subsequent days. In contrast, individuals who generally felt positively regarded by their partners responded to such threats with increased feelings of closeness towards them.

Given that self-esteem positively predicts feelings of positive regard by partners in romantic couples (Murray et al, 2000), these results suggest that people with low levels of self-esteem may react to relational threats by subsequently behaving more negatively towards their partners. Furthermore, a separate analysis of the same data demonstrated that chronic low perceptions of partners' regard predicted declines in that partners' relationship satisfaction, suggesting that the behaviour of individuals with low self-esteem may increase the likelihood of their relationships dissolving (Murray, Griffin et al. 2003). Unfortunately, in their diary studies, Murray, Bellavia et al. (2003) and Murray, Griffin et al. (2003) did not report whether self-esteem uniquely predicted behavioural reactions to threat, although they did control for this variable in their analyses of the effects of a sense of positive regard, which remained significant. It is thus unclear from these studies whether low self-esteem predicts negative reactions to relational threats, a finding which would present a challenge to an adaptive, sociometer perspective.

6.1.4 Relationship Behaviour in the Absence of Threat

The studies described in the previous section suggest that individuals with low levels of self-esteem may respond to threats to their relationships in ways which actually increase the likelihood of their being rejected. These findings conflict with those of the laboratory studies on self-esteem and social behaviour (Heatherton & Vohs, 2000; Vohs & Heatherton, 2001; 2004) discussed above and present a potential challenge to sociometer theory, which predicts that low self-esteem should motivate individuals to attempt to protect and enhance their social relationships as the sociometer performs its regulatory function. However,

all of these studies suffer from the limitation, in relation to the current work, that they fail to investigate how self-esteem influences typical relationship oriented behaviour in the absence of relational threats. Whilst it is undoubtedly the case that individuals in romantic relationships are likely to experience occasional conflicts and threats to their sense of acceptance, it also seems likely that for much of the time such relational threats may be absent. It is possible that people with low levels of self-esteem may react negatively to specific threats, whilst generally behaving more positively towards their partners, and investing more heavily in their romantic relationships, than those with high self-esteem. Thus, the relational behaviour of individuals with low self-esteem may not be generally maladaptive, and their typical behaviour in the absence of threat may actually strengthen their relationships, as would be predicted from a sociometer perspective on the regulatory function of self-esteem (Leary & Baumeister, 2000).

Several lines of evidence support this view. For example, in an early study, Dion and Dion (1975) found that individuals with low self-esteem reported significantly greater feelings of love, liking and trust for their partners than those with high self-esteem. Similarly, Schutz and Tice (1997) asked participants to describe their partners and showed that people with low levels of self-esteem reported significantly less negative attributes than did those with high self-esteem. In addition, individuals with high levels of self-esteem were significantly more likely to make downward comparisons with their partners, whereas those with low self-esteem tended to make upward comparisons. This suggests that, although individuals with high self-esteem typically see their partners positively (e.g. Murray et al, 2000), they also perceive themselves to be superior.

Although these studies did not measure participants' actual behaviour in relationships, these feelings of superiority and inferiority may have important implications for the ways in which individuals with high versus low self-esteem behave towards their partners. From both classical social psychological equity theory (Thibaut & Kelley, 1959) and the evolutionary market value perspective (Pawlowski & Dunbar, 1999), individuals are expected to be concerned with seeking partners whom they perceive to be equal to them in terms of their relational value. Since individuals with low self-esteem perceive themselves to have fewer positive, desirable qualities than their partners (Murray et al, 2005), they may attempt to rectify this imbalance by investing more heavily in their relationships, thus restoring a sense of equity. Evidence supporting this contention comes from a recent study which demonstrated that explicitly priming the concept of social equity led individuals with low self-esteem to report engaging in more positive relationship behaviour relative to controls (Murray, Aloni et al, 2009) This compensatory behaviour would also be predicted from an adaptive sociometer perspective (see Kirkpatrick & Ellis, 2004, for a detailed discussion). In contrast, individuals with high self-esteem perceive themselves to be superior to their partners, so they are not as motivated to behaviourally invest in their relationships. In fact, their positive self-perceptions may even lead these individuals to invest less heavily in existing relationships since they may have greater expectations of being able to form relationships with alternate partners. Consistent with this, Gagne, Kahn, Lydon and To (2008) showed that participants with high self-esteem who were in romantic relationships accepted flattering feedback from an attractive confederate. This effect occurred even in high self-esteem participants who were told that the confederate had been instructed to list only positive

evaluations of them, and who thus could have easily dismissed this positive feedback. In contrast, low self-esteem participants discounted such constrained feedback. This suggests that people with high levels of self-esteem may be especially attuned to the possibility of pursuing alternative relationships.

Thus, it is possible that perceptions of threat mediate the link between self-esteem and behaviour in romantic relationships. Murray, Leder et al. (2009) reasoned that an important aspect of relationship security was individuals' feelings of being irreplaceable to their partner. People who feel that they have unique qualities which their partner could not easily find in an alternative should feel more secure in their relationships than those who feel that they are easily replaceable. Murray, Leder et al. (2009) showed that participants with low self-esteem who had been led to believe that they were more replaceable in their relationships did not increase their behavioural efforts to make themselves irreplaceable, whereas those with high levels of self-esteem did. The authors interpret these results as indicating that individuals with low self-esteem believe that such efforts will be to no avail, since they perceive their relative desirability as low, essentially adopting a defeatist attitude. However, this study also showed that overall self-esteem negatively predicted both narrowing-attention behaviour (designed to focus the partners attention on the self, for example, by engaging in shared activities), and, to a lesser extent, more general positive relationship behaviour. When their sense of being replaceable was not threatened, individuals with low self-esteem reported engaging in more behavioural efforts to satisfy their partners' needs, and to focus their partners' attention and activities on themselves. This study supports previous research on dependency regulation by demonstrating that individuals with low self-esteem may react counter-productively to relational threats. However, it also

suggests that people with low self-esteem may generally behave more positively towards their partners than those with high self-esteem. The present Study 5 further investigated this possibility by examining the relationship between self-esteem and relationship behaviour in women.

6.1.5 Mate Retention Behaviour

To date, relatively few measures have been developed to examine the specific strategies that individuals employ to maintain their romantic relationships. However, one measure which has generated considerable research is the Mate Retention Inventory (MRI; Buss, 1988). Buss (1988) was especially concerned with investigating *mate guarding* behaviour, designed to address the adaptive challenge of maintaining access to a sexual partner whilst preventing rivals from doing so, and also avoiding desertion by the partner. Accordingly, he defined mate retention tactics as “the things that people do when they want to prevent their partner from getting involved with someone else” (Buss, 1988, p. 296). He developed a taxonomy of 104 different acts, organised into 19 tactics. Reflecting the theoretical rationale for its development, most of the acts within the MRI focus on negative tactics designed to control, threaten and coerce partners. For example, it includes tactics such as vigilance (e.g. reading a partners’ personal mail), emotional manipulation, derogation of, and threats and violence towards both partners and perceived intrasexual competitors. In contrast, only five of the 19 tactics comprise “positive inducements”, although participants report actually using these acts the most frequently (Buss, 1988). Positive inducements include acts such as spending money on a partner, enhancing physical attractiveness, using

sexual inducements and emphasising love and caring (which includes just five of the 104 acts).

This focus on the negative aspects of relationship behaviour has led to the MRI being predominantly employed in studies investigating how factors such as discrepancies in mate value and perceptions of infidelity predict behaviour associated with partner abuse by men (e.g. Goetz et al, 2005; Kaighobadi, Starratt, Shackelford & Popp, 2008; Miner, Starratt & Shackelford, 2009). However, in samples of both undergraduate students (Buss, 1988) and married couples (Buss & Shackelford, 1997) women have been shown to report most often using tactics of appearance enhancement, love and care, and verbal and physical signals of possession. There have been no studies to date examining how self-esteem relates to mate retention behaviour in women and for this reason the MRI was included in the present study.

In contrast to the MRI, the partner-specific investment inventory (PSII: Ellis, 1998) focuses more on forms of positive behaviour that individuals perform to maintain and enhance their romantic relationships. It includes subscales measuring strategies such as being expressive and nurturing towards the partner, cultivating a good relationship with his or her family, investing time and money, and being honest and socially attentive. Ellis (1998) used factor analysis to demonstrate that the PSII measured completely distinct aspects of relational behaviour from the MRI. Furthermore, the two instruments showed different patterns of relationships with other variables. Of particular relevance to the current study, Ellis (1998) found that women's felt security in their relationships positively correlated with PSII scores whilst demonstrating a negative relationship with scores on the MRI. From a dependency regulation perspective, felt security positively correlates with self-esteem and also

mediates the relationship between self-esteem and relationship behaviour (e.g. Murray et al. 2006). Ellis' (1998) results support this perspective in suggesting that women who feel insecure in their relationships may actually respond with more negative behaviour, as measured by the MRI, whereas those who are secure may engage in more relationship-enhancing behaviour, as measured by the PSII. These findings do not necessarily support a sociometer perspective, which would predict that individuals with low self-esteem and who feel insecure in their relationships should be motivated to increase their relationship-maintenance behaviour, perhaps employing both positive and negative strategies. However, it is important to note that felt security is not the same construct as self-esteem. To date very few studies have employed the PSII and none have examined its relationship with self-esteem in women.

6.1.6 Aims and Predictions of Study 5

The present study sought to examine the relationships between self-esteem and positive and negative relationship behaviour, in the absence of specific relational threats, in a sample of women engaged in long term romantic relationships. From a sociometer perspective on the relational regulatory function of self-esteem (Leary & Baumeister, 2000), it was predicted that women with lower levels of self-esteem would report using more relationship-maintenance behaviour, as indexed by higher overall scores on both the MRI and PSII. In order to investigate how women's perceptions of their own and their partners' mate value relate to their self-esteem and relationship behaviour, self and partner versions of the Mate Value Inventory (MVI, Kirsner et al. 2003) were included. In line with sociometer theory (Leary & Baumeister, 2000), it was

predicted that self-perceived mate value would positively correlate with self-esteem. Following on from social exchange (Thibaut & Kelley, 1959) and market value (Pawłowski & Dunbar, 1999) theories, it was also predicted that there would be a positive correlation between women's perceptions of their own and their partners' mate value. However, based on previous research on discrepancies in self- and partner perceptions in relation to self-esteem (Murray et al 2000, Schutz & Tice, 1997), it was predicted that women with low levels of self-esteem would perceive their partners' mate value as higher than their own, whereas those with high self-esteem would perceive themselves to be superior to their partner on this measure. Based on social exchange and equity theory perspectives (Thibaut & Kelley, 1959), it was also predicted that women's perceptions of their mate value relative to that of their partners would be negatively related to their overall level of partner investment and mate retention behaviour. This hypothesis reflects the expectation that women who perceive themselves to be less desirable than their partners should attempt to compensate for this imbalance by investing more effort in their relationships.

One potential limitation of the studies on self-esteem in romantic relationships reported above is that they all use unidimensional measures of self-esteem. They therefore fail to address issues concerning whether specific domains of self-esteem are especially predictive of relational behaviour. In order to address this limitation, the present study administered a multidimensional measure of self-esteem, the PEI (Shrauger & Schohn, 1995) which was used in Studies 1 to 3. Given the importance of physical attractiveness for female relational desirability (Buss, 1989) it was predicted that scores on the appearance subscale of the PEI would correlate negatively with scores on the PSII and MRI. This would represent women who perceive

themselves to be less physically attractive attempting to compensate for this by increasing behaviour designed to maintain their relationships. In addition, it was predicted that women's scores on the romantic subscale of the PEI would correlate negatively with their levels of self-reported partner investment and mate-retention behaviour. The romantic subscale of the PEI measures the extent to which individuals feel they are successful in dating and romantic relationships. Thus, people who score highly on this subscale perceive that they can easily form and maintain relationships: From a sociometer perspective, they may be less motivated to maintain their current partnerships than those who feel that their partners would be harder to replace.

6.1.7 Domains of Self-Esteem and Specific Strategies

In addition to these general predictions, it seems probable that specific domains of self-esteem and aspects of mate value (i.e. items on the MVI) might predict specific types of partner investment and mate retention behaviour. From a theoretical point of view, subscales of the MRI and PSII represent specific strategies designed to maintain or enhance relationships. Kirkpatrick and Ellis (2004) discuss how the sociometer system might activate different such strategies. For example, they suggest that one possible way in which the sociometer might perform a relational regulatory function is by motivating individuals to attempt to directly address their perceived deficiencies. However, they suggest that such an approach may in fact be relatively rare and state, without providing supporting evidence, that individuals are unlikely to be able to directly enhance their performance in areas in which they have previously shown deficits. They discuss the example of physical attractiveness, stating that

individuals who are repeatedly rejected by members of the opposite sex are unlikely to be able to improve their attractiveness. However, Kirkpatrick and Ellis (2004) do not present any evidence to support this negative view. In fact there are many potential ways in which people can improve their appearance, including wearing flattering clothes, jewellery and make-up, improving their physique through exercise and dieting and even undergoing cosmetic surgery. Interestingly, a study by Perilloux and Buss (2008) found that a common response to romantic rejection in women was to shop, and the authors suggest that this might be designed to increase their attractiveness to potential new partners. Furthermore, Boyes, Fletcher and Latner (2007) reported a negative correlation between self-esteem and dieting behaviour in women who were in romantic relationships. They inferred that women with low levels of self-esteem may diet to increase their attractiveness to their partners. Thus, if individuals do attempt to directly address perceived deficiencies in attractiveness, a negative correlation between this variable and mate-retention behaviour designed to enhance this (e.g. scores on the “enhancing appearance” subscale of the MRI) might be obtained in the present study.

Another potential strategy which individuals might employ in order to enhance their relational desirability in response to negative self-evaluations in a particular domain would be to attempt to emphasise and enhance their performance in alternate domains. This suggestion is in line with the evolutionary psychological concept of *alternate strategies*, which have been extensively studied in the area of sexual behaviour (see Gangestad & Simpson, 2000, for a review). For example, Waynforth (1999) provided evidence that less physically attractive men invest more time and effort in raising children than do their more attractive contemporaries. Waynforth partly explains these results in

terms of alternate strategies for attracting partners, with less attractive men seeking to display alternative qualities relating to parental investment. Similarly, women in the present study may attempt to compensate for their self-perceived weaknesses in specific areas of mate value and domains of self-esteem by emphasising other areas. For example, women who perceive themselves to be less physically attractive, as measured by appearance-related items on the MVI and the appearance subscale of the PEI, may report engaging in more mate retention behaviour which does not depend on, or relate to, attractiveness (e.g. the “emphasizing love and caring” or “submission and debasement” strategies of the MRI).

Thus, different theoretical considerations yield different predictions about possible relationships between domains of mate value and self-esteem and specific mate-retention strategies and behaviour. For this reason, whilst Study 5 examined correlations between items of the MVI and subscales of the PEI with specific strategies within the MRI and subscales of the PSII, no specific directional predictions about such relationships were made.

6.1.8 Summary of Predictions

Based on the discussions above, the following predictions were made:

H1: There will be a negative relationship between measures of self-esteem and level of mate retention and partner investment behaviour.

H2: There will be a positive relationship between self-esteem and self-perceived mate value.

H3: There will be a positive relationship between women's reports of their own and their partners' mate value.

H4: There will be a positive relationship between women's perceptions of their mate value relative to that of their partners and their self-esteem.

H5: There will be a negative relationship between women's perceptions of their mate value relative to that of their partners and their levels of mate retention and partner investment behaviour.

H6: There will be negative relationships between women's appearance-based and romantic self-esteem and their levels of mate retention and partner investment behaviour.

In addition, it was predicted that specific domains of self-esteem and aspects of mate value would relate to specific forms of mate retention and partner investment behaviour. However, due to the conflicting theoretical perspectives outlined above, no specific directional hypotheses on these relationships were formulated.

6.2 METHOD

6.2.1 *Participants*

One hundred and ninety two women between the ages of 18 and 60 (mean = 27.2, S.D. = 9.8) took part in an online study on self-esteem and relationship behaviour. Participants were recruited by distributing emails to staff and students of the Universities of Huddersfield and Central Lancashire, and to a United Kingdom psychology postgraduate mailing list. The email stated that the investigator was seeking female participants over the age of 18, who were currently involved in romantic relationships having lasted for longer than three months, for a study on self-esteem and relationship behaviour. It explained that the study involved answering questions about how they felt about themselves and their current partner and the things that they did to maintain their relationship. Participants took part in the study by following a link to the webpage hosting it contained within this email. Participants were also asked to forward details of the study to any other women they knew who fulfilled these criteria and might be willing to take part. Participants reported being in relationships lasting between 3 months and 33 years (mean = 4 years 11 months, S.D. = 6 years 7 months).

6.2.2 Materials

6.2.2.1 Mate Value

The Mate Value Inventory (MVI; Kirsner et al. 2003) was used to assess participants' perceptions of their own and their partner's relational desirability as romantic partners. The self-report version of the scale (MVIS) includes 17 items measuring various aspects of mate value including physical (e.g. "attractive face", "healthy"), motivational (e.g. "ambitious", "enthusiastic about sex") mental (e.g. "intelligent", "emotionally stable") and economic (e.g. "currently have financial resources", "will have financial resources") attributes. Participants are required to indicate the extent to which each these attributes currently apply to themselves on seven-point scales ranging from one (*I am very low on this attribute*) to seven (*I am very high on this attribute*). The partner report version of the scale (MVIP) contains 19 items including the 17 items from the self-report scale, together with two items measuring the partner's perceived compatibility with the participant ("shares my values" and "shares my interests"). Participants indicate the extent to which these attributes currently apply to their partners on seven-point scales ranging from one (*my partner is very low on this attribute*) to seven (*my partner is very high on this attribute*). The MVI has been shown to demonstrate acceptable levels of reliability (MVIS Cronbach's $\alpha = .74$, MVIP $\alpha = .78$; Figueredo, Sefcek & Jones, 2006) and to relate to both depression (Kirsner et al, 2003) and expressed preferences for romantic partners (Figueredo et al, 2006). Cronbach's alpha analyses further demonstrated the reliability of the measures in the current sample (MVIS $\alpha = .78$, MVIP $\alpha = .87$). In order to obtain overall measures of self and partner mate value, mean scores for each scale

were calculated for each participant, with higher scores indicating greater perceived value. In order to examine participants' perceptions of their mate value relative to that of their partners (MVIR), mean scores on the MVIP were subtracted from those on the MVIS. Thus positive MVIR scores indicated that the participant considered themselves to be more desirable than their partners, with negative scores indicating feeling less valuable as a mate.

In order to examine how specific aspects of mate value relate to relational behaviour, the MVIS was split into four separate subscales measuring Physical (4 items; "attractive face", "attractive body", "healthy" and "enthusiastic about sex", Cronbach's $\alpha = .63$), Personality (4 items; "sociable", "emotionally stable", "good sense of humour" and "independent", Cronbach's $\alpha = .60$), Parenting (5 items; "loyal", "responsible", "kind/understanding", "generous", "faithful to partner" and "desire children", Cronbach's $\alpha = .56$) and Resource (4 items; "intelligent", "currently have financial resources", "will have financial resources" and "ambitious", Cronbach's $\alpha = .63$) related aspects of desirability.

6.2.2.2 Self-Esteem

Global self-esteem was assessed using the Rosenberg (1965) Self-Esteem Scale (SES) utilised in Studies 1 to 4 and described in detail in Section 2.2.2.2. Global and specific domains of self-esteem were assessed using the Personal Evaluation Inventory (PEI; Shrauger & Schohn, 1995) utilised in Studies 1 to 3 and described in detail in Section 2.2.2.3.

6.2.2.3 Relationship Behaviour

Participants' self-reported behaviour in the context of their romantic relationships was assessed using both the Mate Retention Inventory (MRI; Buss, 1988) and the Partner-Specific Investment Inventory (PSII; Ellis, 1988). The MRI consists of 104 items measuring behaviour designed to prevent a romantic partner from becoming involved with someone else (Buss, 1988). It is organised hierarchically with specific acts (e.g. "I gave in to his sexual requests", "I dressed nicely to maintain his interest") comprising tactics (e.g. "sexual inducements", "appearance enhancement") which are further organised into super-ordinate categories (e.g. "positive inducements", "public signals of possession"). Participants were asked to indicate how often they had performed each act in the past year on a four-point scale ranging from zero (*I have never performed this act*) to three (*I have often performed this act*). The overall MRI scale demonstrated a high level of internal consistency in the current sample (Cronbach's $\alpha = .93$) and previous studies have found that women's self-reports show significant positive correlations ($r = .43$, $p < .001$) with their partners' reports of the women's mate retention acts (Shackelford, Goetz & Buss, 2005). This indicates that the MRI is an accurate, reliable and valid measure of mate retention behaviour in women.

The PSII (Ellis, 1998) consists of 52 items that measure behaviour designed to solve adaptive problems concerning maintaining romantic relationships. Thirty-five items measure the frequency of various acts of behaviour (e.g. "I buy my partner gifts", "I comfort my partner when he is distressed"). Participants are asked to indicate how often they have performed each of these acts in the past six months on five-point scales ranging from zero

(*never*) to four (*very often*). A further 17 items require participants to indicate the extent to which they agree that various statements describe themselves (e.g. “I am warm and sympathetic in conversation with my partner”, “I enjoy my partner’s family gatherings”) on seven-point scales ranging from one (*Strongly disagree*) through three (*Neutral (neither agree nor disagree)*) to seven (*Strongly agree*). Based on the results of a factor analysis, Ellis (1998) organised items into nine sub-scales measuring the extent to which individuals reported being expressive and nurturing, future-oriented, giving of time, sexually proceptive, monetarily-investing, honest, physically protective, socially attentive, having a good relationship with their partner’s family, and not sexualising others. Sub-scale scores together with overall investment scores were calculated following procedures described by Ellis (1998). The overall scale has been previously shown to demonstrate an acceptable level of internal consistency (Chronbach’s $\alpha = .75$; Ellis, 1998) and this was further demonstrated in the current sample ($\alpha = .91$). Furthermore, Ellis (1998) found that women’s self-reported scores on the PSII significantly positively correlated ($r = .45, p < .01$) with their partners’ reports of the women’s investment behaviour. This indicates that the PSII is a reliable and valid measure of partner investment behaviour in women.

6.2.3 Procedure

Participants took part in the study by following a link to a website distributed by email. The first page explained that the aim of the study was to examine how women’s self-perceptions relate to their behaviour in their romantic or sexual relationships. They were informed that the study would take approximately half

an hour to complete and involved rating aspects of their own and their partner's desirability and reporting on their self-esteem and the frequency in which they engaged in various forms of behaviour to help maintain their relationships. They were informed that some of these acts were positive (e.g. buying a partner gifts) whilst others were negative (e.g. threatening or using violence) and that if they felt that these negative items might upset them, they should not take part. Participants were also assured of their anonymity and the confidentiality of their data, and informed that they should simply leave blank any items to which they did not want to respond, and of their right to withdraw from the study at any point. They were also provided with contact details of the investigator should they wish to ask questions or receive further information about the study. Participants indicated their agreement to take part by clicking on a "next page" button at the bottom of the page. The following page asked participants to indicate their age and sex, whether they were currently in a romantic or sexual relationship which had lasted more than three months, and if so, how long they had been in this relationship. Participants who indicated that they were male or were not currently in a relationship were directed to a page which thanked them for their interest but stated that since the study concerned women in long-term relationships, they should not participate.

Participants then completed the MVIS, having been instructed to consider how much they felt that the following attributes currently applied to them. They indicated their responses by clicking on check-boxes for each item before clicking on the "next page" button. The next page asked participants to consider how much they felt the following attributes currently applied to their partners and they then completed the MVIP.

Participants were then asked to indicate their feelings towards the following statements by clicking on them, and did so to complete the SES. Following this, they were presented with instructions for completing the PEI. They were informed that the following pages listed a number of statements that reflected common feelings, attitudes, and behaviour. They were asked to read each statement carefully, think about whether they agreed or disagreed that it applied to them, and select the appropriate response. They were asked to try to respond honestly and accurately, but were informed that it was not necessary to spend much time deliberating about each item and that they should think about how the item applied to them during the past two months unless some other time period was specified.

After completing the PEI, participants were presented with instructions for completing the frequency items of the PSII. They were asked to use the scales below to rate how often they performed each of the following forms of behaviour in the context of their current relationship. They were instructed to think only about the last six months (or if their relationship had lasted less than six months, to rate how often they behaved in each of the specified ways during the time they had been together). If they felt a question did not apply to them, they were asked to select "NA (Not Applicable)". Participants then completed the frequency items for the PSII before being presented with instructions for the self-perception items of this scale. They were asked to think about their current relationship and whether the following statements described them using the scales provided to indicate the extent to which they agreed or disagreed with each statement.

Having completed the PSII, participants were presented with instructions for the MRI. They were informed that the following pages listed a series of acts of

behaviour. The instructions further stated that the study concerned the acts that people perform in the context of their relationship with their romantic partner. For each act, participants were asked to use the scale provided to indicate how frequently they had performed it within the past year. After completing the MRI, participants were presented with a debriefing page, where they were thanked for their participation, reminded of the aims of the study, provided with information about sources of support relevant to the issues explored in the study, and encouraged to contact the investigator with any further questions.

It should be noted that all participants completed the above measures in the same order since the software used to construct the study did not allow for counterbalancing of the order of presentation of the materials. This should be borne in mind when examining the results of the study, since order effects may have influenced these.

6.3 RESULTS

6.3.1 Data Considerations

Due to the design of the study, it was possible for participants to complete some scales whilst omitting others and several participants had some items of missing data. A conservative analytical strategy was employed with respect to this, whereby participants with any missing data on a given scale or sub-scale were excluded from analyses of those measures. Therefore sample sizes varied between analyses and so their values are reported separately for each statistical test¹.

The analytical strategy for the present study included calculating unusually large numbers of intercorrelations between the scales and subscales measured. Since conducting such a large number of inferential tests greatly increases the chances of committing type I errors, a relatively conservative alpha level of .01 was chosen as the criterion of significance in subsequent correlational analyses reported in this section. Nonetheless, since strict Bonferroni adjustments were not made (in order to attempt to avoid the excessive attendant risk of committing type II errors), correlational results should be interpreted with caution, due to this increased risk of type I errors.

¹ Consideration was given as to whether to attempt to use a method such as the EM procedure to calculate missing values (see Graham, 2009). However, in most cases, participants with any missing data for a particular scale had simply omitted the complete scale, and so such an analysis was not possible for these participants. Since the remaining cases with missing values for each scale consisted of less than 5% of the sample, it was decided that list-wise deletion of these cases for each scale was the most appropriate approach (Graham, 2009).

6.3.2 Descriptive Statistics

Table 22 displays a summary of all study scales together with descriptive statistics for these.

6.3.3 Do Women's Self-Esteem and Self-Perceived Mate Value Relate to their Relationship Behaviour?

In order to examine the relationships between participants' perceptions of their own and their partners' mate value and their self-esteem, overall mate retention and partner investment, a series of two-tailed Pearson's correlation coefficients were calculated. Table 23 displays the results of these analyses.

Table 22:

*Descriptive Statistics for Complete Mate Value, Self-Esteem, Mate Retention
and Partner Investment Scales*

Scale	Item Mean	S.D.	Item Range	Number of Items	N
Mate Value					
Inventory Self					
(MVIS)	5.14	.59	1-7	17	180
Mate Value					
Inventory Partner					
(MVIP)	5.36	.74	1-7	19	181
Self-esteem Scale					
(SES)	3.01	.53	1-4	10	186
Personal Evaluation					
Inventory (PEI)					
	2.62	.39	1-4	54	157
Partner Specific					
Investment					
Inventory (PSII):					
Act frequency					
items	3.16	.38	0-4	35	99
Attitude items	4.31	.48	1-7	17	158
Mate Retention					
	.79	.24	0-3	104	128
Inventory (MRI)					

Table 23:

Intercorrelations Between Mate Value, Global Self-Esteem, Mate Retention and Partner Investment

Scale		1	2	3	4	5	6	7
1. MVIS	R	-	.39*	.38*	.54*	.61*	-.10	.27*
	N	180	175	175	177	148	122	120
2. MVIP	R		-	-.70*	.20*	.26*	-.02	.65*
	N		181	175	177	149	123	123
3. MVIR	R			-	.23*	.20*	-.05	-.50*
	N			175	172	144	118	118
4. SES	R				-	.80*	-.17*	.00
	N				186	155	125	124
5. PEI	R					-	-.28*	.00
	N					157	120	117
6. MRI	R						-	-.01
	N						128	102
7. PSII	R							-
	N							126

MVIS = Mate Value Inventory Self, MVIP = Mate Value Inventory Partner, MVIR = Mate Value Inventory Relative (Self – Partner), SES = Self-Esteem Scale, PEI = Personal Evaluation Inventory, MRI = Mate Retention Inventory, PSII = Partner-Specific Investment Inventory

* $p < .01$

The results shown in Table 23 provide mixed support for the hypothesis that self-esteem would be negatively related to participants' overall use of mate retention and partner investment behaviours. Specifically, although the mate retention inventory displayed weak negative correlations with both the self-esteem scale and personal evaluation inventory measures of self-esteem, the partner-specific investment inventory did not. This indicates that although women with lower levels of self-esteem report engaging in more behaviour designed to prevent their partners from becoming involved with someone else, they do not report investing more heavily in their relationships.

However, the results shown in Table 23 strongly support the second hypothesis, that self-esteem would be positively related to women's perceptions of their mate value. Women's scores on the mate value inventory demonstrated strong and significant positive correlations with both the self-esteem scale and personal evaluation inventory measures of self-esteem. This accords with sociometer theory in indicating that women who feel that they are highly desirable as romantic partners have correspondingly high levels of self-esteem.

Furthermore, as predicted, Table 23 shows that women's perceptions of their own and their partner's mate value demonstrated significant moderate positive correlations. This accords with equity theory and market value perspectives, which predict that individuals should seek partners who are similar to themselves in terms of their overall desirability.

Although these positive correlations indicate that women generally believed themselves to have similar levels of relational desirability to that of their partners, perceived discrepancies in mate value did demonstrate some predicted relationships with both self-esteem and partner investment behaviour. As predicted, self-esteem, as measured by both the self-esteem scale and

personal evaluation inventory, demonstrated moderate, significant positive relationships with women's perceptions of their mate value relative to that of their partners. This supports the hypothesis, based on previous research, that individuals with high self-esteem often feel superior to their romantic partners. Furthermore, as predicted, Table 23 shows a strong negative correlation between women's perceptions of their mate value relative to their partners and the extent to which they reported investing in their relationships. This suggests that women who feel less desirable than their partners may attempt to compensate for this discrepancy by investing more in their relationships. However it should be noted that since relative mate value correlates more strongly with partner as opposed to self mate value, it is likely that women's perceptions of the desirability of their partners contributes more to their perceptions of their relative mate value. For this reason, it should be borne in mind that subsequently reported relationships between relative mate value and other variables may be best explained by women's perceptions of the desirability of their partners.

In order to further examine relationships between women's perceptions of their mate value relative to that of their partners, self-esteem and partner investment behaviour, participants were split into two groups on the basis of their relative mate value scores. Participants with positive relative mate value scores, who thus considered themselves to be more desirable than their partners ($n = 51$) were distinguished from those with negative scores ($n = 124$) indicating feeling less desirable than their partners. One-tailed independent samples t-tests revealed that women who reported being more desirable than their partners reported significantly higher levels of self-esteem as measured by both the SES (means = 3.18 vs. 2.93, $t(170) = 2.76$, $p < .01$) and global scores

on the PEI (means = 2.71 vs. 2.58, $t(142) = 1.77$, $p < .05$) than those who felt less desirable than their partners. This indicates that women who feel superior in mate value to their partners have greater feelings of self-worth than those who feel inferior to them. Furthermore, a one-tailed independent samples t-test revealed that women who reported being more desirable than their partners reported engaging in significantly less partner investment behaviour than those who felt less desirable than their partners (mean standardised PSII scores = -.31 vs. .19 respectively, $t(116) = 3.68$, $p < .01$). These results further support the hypotheses that women who feel more desirable in relation to their partners will have higher levels of self-esteem, and will engage in less behaviour designed to maintain and enhance their relationships.

6.3.4 Does Self-Esteem or Relative Mate Value Predict Relationship Behaviour?

A series of multiple regression analyses were performed in order to further investigate the hypothesis that self-esteem will influence mate retention and partner investment behaviour. In order to control for possible effects of relationship length and age on the outcome measures, these variables were entered on the first step of each of the regression analyses reported here. Following this, the second step of the multiple regressions was conducted entering participants' scores on the SES and PEI as predictors, with scores on the MRI (Mate Retention Inventory) and PSII (Partner-Specific Investment Inventory) as the criterion variables. In order to examine the hypothesis that women's perceptions of their mate value relative to that of their partners will influence their relational behaviour, relative mate value was also entered as a

predictor in the second step of the analyses. Table 24 shows the results of these analyses.

The results shown in Table 24 provide only very weak evidence to support the prediction that self-esteem will influence relational behaviour. Although self-esteem, as measured with the Personal Evaluation Inventory, significantly negatively predicted mate retention behaviour, scores on the more widely used Self-Esteem Scale did not. Furthermore, the analysis indicates that PEI scores accounted for just 5% of the variance in mate retention behaviour. Thus, although there is some evidence that women with lower levels of self-esteem engage in more mate retention behaviour, the effect is extremely weak in the current sample. Furthermore, neither measure of self-esteem significantly predicted PSII scores. This does not support the prediction that individuals with low self-esteem will engage in more behaviour designed to maintain and enhance their relationships.

The results shown in Table 24 provide some support for the hypothesis that women's perceptions of their desirability relative to their partners will predict their relational behaviour. Relative mate value significantly negatively predicted partner investment behaviour, accounting for approximately 27% of the variance in this. This indicates that women who feel less desirable relative to their partners report investing more in their relationships. However, relative mate value did not significantly predict the overall use of mate retention tactics in the present sample. Thus, although women who feel less desirable relative to their partners report investing more heavily in their relationships, they do not appear to engage in more behaviour designed to prevent their partner becoming involved with someone else.

Table 24:

Summary of Regression Analyses for Variables Predicting Relationship Behaviour, as indicated by MRI and PSII

Criterion	Predictor	B	SE B	B
MRI	Step 1			
	(R ² = .13, p < .01)			
	Age	-.01	.01	-.47*
	Relationship Length	.01	.01	.21
	Step 2			
	(ΔR ² = .05, p < .01)			
	Age	-.01	.01	-.36*
	Relationship Length	.01	.01	.22
	SES	.11	.08	.24
	PEI	-.26	.10	-.42*
MVIR	-.01	.03	-.01	
PSII	Step 1			
	(R ² = .08, p < .05)			
	Age	-.01	.01	-.12
	Relationship Length	-.01	.01	-.19
	Step 2			
	(ΔR ² = .27, p < .01)			
	Age	-.01	.01	-.13
	Relationship Length	-.01	.01	-.16
	SES	.30	.18	.22
	PEI	.21	.27	.11
MVIR	-.58	.09	-.53*	

MRI = Mate Retention Inventory, PSII = Partner Specific Investment Inventory, SES = Self-Esteem Scale, PEI = Personal Evaluation Inventory, MVIR = Mate Value Inventory Relative (self – partner)

* p < .05

6.3.5 Do Specific Domains of Self-Esteem Influence Relationship Behaviours?

In order to examine whether specific domains of self-esteem most relevant to romantic or sexual relationships predicted overall relationship behaviour, two-tailed Pearson's correlations were calculated between participants' scores on the appearance and romantic subscales of the PEI and their overall scores on the MRI and PSII. Contrary to predictions, neither women's romantic ($r = -.16$, $p = .07$, $n = 128$) nor appearance-related self-esteem ($r = -.17$, $p = .06$, $n = 126$) were significantly related to their overall frequency of mate retention behaviour. Similarly, women's romantic ($r = .17$, $p = .06$, $n = 125$) and appearance-related ($r = -.13$, $p = .16$, $n = 124$) self-esteem did not significantly relate to their overall partner investment behaviour.

These results suggest that, contrary to predictions, romantic and appearance-based self-esteem do not influence women's overall engagement in behaviour designed to maintain and enhance their relationships.

In order to examine whether women's levels of appearance and romantic self-esteem influenced the specific types of behaviour they engaged in to attempt to maintain and enhance their relationships, a series of two-tailed Pearson's correlations were performed between these subscales of the PEI and specific mate retention tactics of the MRI and subscales of the PSII. Due to the large number of intercorrelations, only significant results and those of special theoretical interest are reported here.

Participants' self-reported appearance-related self-esteem demonstrated a marginally significant weak negative correlation with their self-reported

appearance-enhancement mate-retention tactics ($r = -.19, p < .05, n = 159$). This indicates that women who feel less happy with their physical appearance engage in more effort to enhance this in their efforts to maintain their relationships. However, scores on the appearance subscale of the PEI did not show any other significant correlations with mate-retention tactics or partner-investment behaviour at the 1% alpha level. These results indicate that although women who feel less confident about their attractiveness may expend more effort in attempting to improve this, appearance-based self-esteem does not appear to influence any other specific forms of relational behaviour.

In contrast, participants' self-reported romantic self-esteem demonstrated significant weak negative correlations with the mate-retention tactics of concealing their mates ($r = -.24, p < .01, n = 160$), punishing their mates' threats of infidelity ($r = -.23, p < .01, n = 161$), derogating their mates ($r = -.23, p < .01, n = 160$) and engaging in violence towards an intrasexual competitor ($r = -.35, p < .01, n = 159$). However, this latter result needs to be interpreted with caution. Mean scores on this tactic of intrasexual violence were very low (overall mean = .03, $SD = .10$) and 146 (90%) of the 163 women who provided complete data for this subscale had scores of zero indicating that they had never used violent tactics. In order to address this, this variable was dichotomised such that participants who had zero scores formed one group, with those with non-zero scores assigned to the other. Following this, a point biserial correlation between romantic self-esteem and the dichotomised MRI violence variable was calculated. This demonstrated a significant negative correlation ($r = -.30, p < .01, n = 159$) indicating that women who had engaged in some violence towards intrasexual competitors had lower levels of romantic self-esteem than those who had not.

In general the above relationships indicate that women who perceive their competence and success in romantic relationships more positively, report engaging in less negative behaviour designed to prevent their partners from becoming involved with other people.

In contrast, the romantic subscale of the PEI demonstrated weak significant positive correlations with the PSII Expressive/Nurturing ($r = .27, p < .01, n = 156$) and Giving of Time ($r = .21, p < .01, n = 160$), and a moderate significant positive correlation with the Future Oriented ($r = .41, p < .01, n = 151$) subscales of the PSII. These relationships indicate that women who felt more positively about their competence and success in romantic relationships reported being more expressive and nurturing of their partners, giving more time and being more committed to the future in their current relationships. These results do not support the prediction that women who feel less confident about their desirability as romantic partners will engage in more compensatory relationship maintenance and enhancement behaviour.

6.3.6 Do Specific Aspects of Mate Value Influence Relational Behaviour?

In order to examine whether specific aspects of mate value predict specific acts of relational behaviour, two-tailed Pearson's correlations were calculated between subscales of the MVIS and mate retention tactics of the MRI and subscales of the PSII. Due to the large number of intercorrelations, for clarity of presentation only significant relationships and non-significant correlations of special theoretical interest are reported here.

6.3.6.1 *Mate Retention Tactics*

Participants' scores on the physical subscale of the MVIS were marginally significantly weakly positively related to their self-reported use of sexual inducements as a mate retention tactic ($r = .16, p < .05, n = 160$). This indicates that women who viewed themselves as being more physically attractive, healthy and enthusiastic about sex report more frequently using sexual inducements to help retain their partners. Interestingly, physical mate value did not significantly relate to appearance enhancement tactics ($r = .11, p = .17, n = 162$) indicating that women's self-perceived attractiveness, health and enthusiasm about sex did not relate to their self-reports of behaviour designed to increase their physical attractiveness.

Participants' scores on the personality subscale of the MVIS demonstrated weak significant negative correlations with the mate retention tactics of emotional manipulation ($r = -.31, p < .01, n = 157$), derogating competitors ($r = -.23, p < .01, n = 160$), submission and debasement ($r = -.22, p < .01, n = 164$) and threatening intrasexual rivals ($r = -.24, p < .01, n = 164$). These relationships indicate that women who perceive themselves to have more desirable personality traits report engaging in less negative mate retention behaviour concerning manipulating their mates and derogating and threatening rivals, and positive inducements of submitting to their partner's wishes.

Participants' scores on the parenting subscale of the MVIS demonstrated a weak significant negative correlation with the mate retention tactic of concealing their mates ($r = -.20, p < .01, n = 161$). This relationship indicates that women who believe themselves to be more loyal, responsible, faithful and kind and who

have a greater desire for children report engaging in fewer efforts to conceal their current partners from intrasexual competitors.

Interestingly, with the exception of the violence subscale of the MRI, participants' scores on the resource subscale of the MVIS did not significantly correlate with any mate retention tactics. This indicates that women's perceptions of their intelligence and ambition, together with their current and future financial resources, do not relate to their mate retention behaviour. This may reflect the fact that these aspects of mate value, which are largely related to traits concerning parental investment of resources, are not strongly related to overall relational desirability in women (Buss, 1989). Thus perceived deficits in this domain may have less of a motivational influence on women's mate retention behaviour than would perceived deficits in other domains of attractiveness.

With respect to mate retention tactics involving the use of violence towards intrasexual competitors, the Resource subscale of the MVIS was weakly significantly negatively correlated with women's reports of their use of this tactic ($r = -.25, p < .01, n = 163$), as were the Physical ($r = -.21, p < .01, n = 163$) and Personality ($r = -.24, p < .01, n = 163$) subscales of the MVIS. However, again, due to the large numbers of zero responses with respect to intrasexual violence, these results need to be interpreted with caution. In order to address this issue, point-biserial correlations were calculated between the dichotomised MRI violence variable and these subscales of the MVIS. The dichotomised MRI violence variable demonstrated a weak significant negative relationship with the Personality subscale of the MVIS ($r = -.19, p < .01, n = 163$), but the relationships with the Physical ($r = -.15, p = .04, n = 163$) and Resource ($r = -.10, p = .19, n = 163$) subscales were non-significant. This indicates that women

who had used violence towards intrasexual competitors considered themselves to have less desirable personality characteristics than those who did not.

Overall, these results provide partial support for the hypothesis that individuals who perceive themselves to be less desirable as relational partners will engage in more behaviour designed to prevent their partners from becoming involved with another individual. The results indicate that women's perceptions of the desirability of their personalities may be especially important in this regard. However, it should be noted that most of the correlations between mate value and mate retention tactics reported here are low, and so in general it seems that women's perceptions of their desirability as mates do not strongly relate to their mate retention behaviour.

6.3.6.2 Partner Investment Behaviour

Participants' scores on the physical subscale of the MVIS demonstrated a significant moderate positive correlation with their scores on the sexually proceptive subscale of the PSII ($r = .40, p < .01, n = 165$). This indicates that women who perceived themselves as being more physically attractive, healthy and enthusiastic about sex reported using more sexual behaviours as a means of investing in their partners. However, this relationship may be largely due to the "enthusiastic about sex" item of the MVIS. It seems likely that this will demonstrate a large degree of measurement overlap with PSII items measuring sexual proceptivity, and thus the theoretical significance of this relationship is unclear.

The personality subscale of the MVIS did not show any significant relationships with subscales of the PSII, suggesting that women's perceptions

of their independence, sociability, emotional stability and sense of humour are unrelated to their specific acts of partner investment behaviour. In contrast, participants' scores on the parenting subscale of the MVIS demonstrated weak significant positive relationships with the Expressive/Nurturing ($r = .22, p < .01, n = 158$), Future Oriented ($r = .24, p < .01, n = 156$), Giving of Time ($r = .34, p < .01, n = 164$) Honest ($r = .35, p < .01, n = 170$) and Socially Attentive ($r = .23, p < .01, n = 168$) subscales of the PSII. These positive correlations indicate that women who consider themselves to have more positive qualities concerning their faithfulness, responsibility and kindness, and nurturing, report engaging more in a wide range of behaviour indicative of investing in their relationships. These results do not accord with the prediction that individuals who consider themselves to be less desirable as partners will invest more in their relationships.

To summarise the present results, the prediction that women who perceive themselves to be less desirable as relational partners will engage in more efforts designed to maintain and enhance their relationships was only partially supported. Whilst women with lower levels of self-perceived desirability report engaging in more specific negative mate retention tactics designed to prevent their partner from becoming involved with someone else, they do not report investing more heavily in their relationships. In fact, women who perceive themselves to be more desirable report more specific forms of positive investment behaviour.

6.3.7 Do Domains of Self-Esteem and Specific Aspects of Mate Value Predict Overall Mate Retention and Partner Investment Behaviour?

In order to examine whether specific domains of mate value and self-esteem predicted overall mate retention and partner investment behaviour, a series of hierarchical multiple regression analyses were conducted. In order to control for the possible effects of the age of the participants and the lengths of their relationships, these variables were entered in the first step of the analysis. Following this, all 4 subscales of the MVIS together with the Romantic and Appearance subscales of the PEI were entered as predictors in stepwise multiple regression analyses with participants' mean overall MRI scores, and overall scale scores on the PSII as criterion variables. After controlling for the effects of age and relationship length, the only significant predictor of MRI scores was the personality subscale of the MVIS ($B = -.06$, $SE. B = .03$, $\beta = -.19$, $p < .05$). This indicates that women who consider themselves to have more desirable positive personality traits report engaging in less overall behaviour intended to prevent their partners from becoming involved with another individual. However, the ΔR^2 value of .03 for the second step of the analysis indicated that MVIS personality scores accounted for just 3% of the variance in women's overall mate retention behaviour, reflecting the low correlations between these measures reported above.

Similarly, after controlling for the effects of age and relationship length, the only significant predictor of women's overall PSII scores was the parenting subscale of the MVIS ($B = .46$, $SE. B = .09$, $\beta = .40$, $p < .01$). This indicates that women who perceive themselves to be more loyal, responsible, faithful and kind and who have a greater desire for children report investing more heavily in their

relationships. The ΔR^2 value of .16 for the second step of this analysis indicates that women's MVIS parenting scores account for 16% of the variance in their overall investment behaviours.

These results do not support the hypothesis that specific appearance-based and romantic domains of self-esteem will predict mate retention and partner investment behaviour. Instead, a woman's perceptions of her value as a mate is a better predictor of relational behaviour in the present sample. Specifically, women's assessments of their desirable personality characteristics negatively predicted the extent of their behaviour designed to prevent their partners from becoming involved with another individual (although the first variable only accounted for a very small percentage of the variance in the second). In contrast, women's assessments of their positive traits and abilities about parenting positively predicted the extent to which they reported investing in their relationships.

6.4 DISCUSSION

The results of Study 5 provide only partial support for the hypothesis that women with lower self-esteem will engage in greater efforts to maintain and enhance their romantic relationships than those with higher self-esteem. Self-esteem, as measured by both the PEI and the SES, demonstrated significant but weak negative correlations with mate retention behaviour, indicating that women with higher self-esteem report engaging in fewer efforts to prevent their partners becoming involved with alternative partners, compared to those with lower self-esteem. This finding supports the current hypothesis, derived from sociometer theory (Leary & Baumeister, 2000) that low self-esteem responds to perceived deficits in relational value by motivating behaviour designed to secure or enhance social relationships. However, only scores on the PEI measure of self-esteem significantly predicted mate retention; women's scores on the more widely used Self-Esteem Scale (Rosenberg, 1965) did not significantly predict their self-reported behaviour. Furthermore, PEI scores accounted for only a very small proportion of the variance in mate retention behaviour, suggesting that the influence of self-esteem on mate retention is very weak. Moreover, neither of the self-esteem scales employed in Study 5 significantly predicted or correlated with women's reports of the extent to which they invested in their current partners. Similarly, contrary to predictions, women's self-esteem in the areas of romantic and appearance domains did not demonstrate significant relationships with relational behaviour. Thus, although some of the present results support the hypotheses, derived from sociometer theory, further studies are needed to reliably establish whether self-esteem does in fact predict relationship behaviour.

Although self-esteem did not predict or relate to partner investment behaviour, women's perceptions of their mate value relative to that of their partners did significantly negatively predict their investment behaviour, accounting for a sizeable proportion of the variance. The results indicate that women who perceived themselves to be less desirable than their partners report investing more in their relationships than do those who feel themselves to be superior to their mates, although the pattern of correlations suggest that this relationship may have been largely driven by women's perceptions of the mate value of their partners. Nonetheless these results may be seen to support predictions derived from both social equity (Thibaut & Kelley, 1959) and market value (Pawlowski & Dunbar, 1999) theories by suggesting that individuals seek to balance the sum of relative costs, benefits and contributions between romantic or sexual partners. From this perspective, the present results represent women who feel that they have fewer desirable qualities than their partners attempting to make up for this imbalance by investing more time, effort and economic resources in their relationships. Of course, this is only one possible interpretation of the present results, and the correlational design of the study precludes making definitive causal inferences. It is possible, for example, that investing more heavily in a partner leads to feeling less desirable than him, or that a third variable may explain the observed relationship, but it is very difficult to offer a theoretical explanation for why this might be or to suggest a suitable candidate for an underlying variable. Nonetheless, experimental evidence is needed to support the current interpretation of a causal influence of self-perceptions of relative mate value on relational behaviour. For example, it would be possible to conduct laboratory studies designed to manipulate romantic partners' self-perceptions of their desirability relative to each other.

Couples could be given bogus feedback about their physical attractiveness, personality and other traits related to their desirability, such that in a given session, one individual was given far more positive feedback than their partner, in the presence of both. Participants could then be required to report on the extent to which they felt motivated to invest in their relationships. If individuals who had been made to feel less desirable than their partners were found to demonstrate greater motivation to invest in their partners, this would support the present interpretation. Alternatively, diary studies could be conducted to examine whether daily experiences influencing participants' perceptions of their desirability relative to that of their partners predicted their investment behaviour on subsequent days. This proposed research would be similar to the diary study conducted by Murray, Bellavia et al (2003), which indicated that individuals with low self-esteem reacted to perceived rejection and negativity of their partners with more negative behaviour on subsequent days. The authors interpreted this negative behaviour in terms of efforts by individuals to psychologically distance themselves from a rejecting partner, in accordance with a dependency regulation perspective. However, from the current equity perspective, these individuals may have reacted to their partner's rejecting or negative behaviour by lowering their perceptions of their partner's desirability and subsequently engaging in fewer investing efforts, or more simply by retaliating in kind. Since the proposed laboratory study would use experimenters or confederates to manipulate individuals' self-perceptions, motivational responses to manipulations of relative value could be examined in the absence of direct negative interactions between partners (and thus in the absence of clear and direct threats to the relationship). It would also be interesting to investigate whether any such perceived equity effects on relational behaviour reflect

conscious and deliberative processes, or whether such equity motivations work on a sub-conscious level. Requiring participants in diary studies to reflect on their motivations together with their actual relational behaviour may help to shed light on this issue.

The results of Study 5 accord with those of Study 1, and predictions derived from sociometer theory, in demonstrating that individuals' self-perceptions of attributes which are important in the interpersonal domain are related to their feelings of self-worth. Study 5 demonstrated significant moderate positive relationships between women's perceptions of their value as mates and their global self-esteem. A sociometer theory interpretation of these findings would suggest that self-perceived mate value exerts a causal influence on global self-esteem, due to its implications for relational inclusion and status. However, the correlational design of the present study does not preclude the possibility that self-esteem exerts a causal influence on self-perceptions of mate value, or that a third variable is responsible for the observed relationship. This issue of the direction of causation surrounding the relationship between self-perceived mate value and self-esteem could be profitably explored by employing sub-conscious priming manipulations such as that used in Study 4. Studies could investigate whether manipulating self-perceptions of mate value affect self-esteem, as would be predicted by sociometer theory, and whether manipulating global self-esteem affects self-perceptions of mate value, as would be predicted from a top-down perspective on the nature of self-esteem (e.g. Brown et al. 2001). This issue of causation is key to any evaluation of sociometer theory, and is discussed in greater length in the concluding chapter of the present work.

The present results indicating significant correlations between subscales of the mate value and self-esteem measures and the relational behaviour

inventories suggest that women may use specific mate retention and partner investment behaviour which draws on their perceived interpersonal strengths. For example, women who perceived themselves to be healthier and more attractive reported using sexual inducements more as a way of retaining their partners, and being more sexually proceptive in their relationships. However, there was no significant relationship between this physical domain of mate value and appearance enhancement behaviour in women in the present sample. The present findings supported previous research with the MRI (Buss & Shackelford, 1997) in indicating that appearance enhancement is second only to emphasising love in terms of its frequency of use as a mate retention tactic in women. Thus, it seems probable that most women, regardless of their self-perceptions, consider attending to, and attempting to enhance their appearance important in their efforts to maintain their relationships, reflecting the fact that physical attractiveness is a particularly important determinant of female relational desirability (Buss, 1989). However, women's appearance-related self-esteem did show a significant negative relationship with their self-reported efforts to enhance their appearance, indicating that women who felt more negative about their attractiveness reported engaging in more efforts to improve this. This challenges the suggestion by Kirkpatrick and Ellis (2004) that the sociometer system should motivate individuals to avoid trying to compete in interpersonal domains where they perceive themselves to be weak. It may be the case that women are aware that their physical attractiveness is especially important in determining their relational desirability (Buss, 1989) and so those who feel negative about their relative standing on this attribute may also feel that they must attempt to compete in this domain.

Women's self-perceptions of their abilities relevant to acquiring financial resources did not generally relate to their relational behaviours. This may reflect the fact that women's access to resources does not generally strongly relate to their market value or desirability as a mate (Buss, 1989). Thus, from an adaptive sociometer perspective, women's negative self-perceptions in this domain would not be expected to strongly motivate compensatory relational behaviour. In contrast, male relational desirability is more strongly related to resource acquisition abilities (Buss, 1989) and men are more likely than women to use resource display as a mate retention tactic (Buss & Shackelford, 1997). Thus, it would be interesting to examine whether men's self-perceptions of their access to, and ability to acquire, resources predict their overall and specific mate retention and partner investment behaviour. If individuals generally use strategies which draw on their specific strengths, as suggested by the present results, it might be predicted that men's resource-related mate value would be positively related to their use of the mate retention tactics of resource display, and monetarily investing partner investment behaviour.

The present results indicated that women who perceived themselves to have more positive personality traits reported engaging in less negative mate retention behaviour, as did those with higher levels of self-esteem in the romantic domain. In contrast, women with higher levels of romantic self-esteem, who thus feel more positive about their ability to form and maintain relationships, reported investing more heavily in their partners in a number of different ways. To summarise the present findings, it seems that women who perceive themselves more positively report engaging in more positive relational investment behaviour whereas negative self-perceptions relate to the use of negative behaviour designed to prevent the partner from becoming involved

with another individual. These findings suggest that self-esteem may not directly relate to the overall level of effort that individuals invest in protecting and maintaining their relationships, but rather the specific strategies used to do this. These results mirror those of Miner et al. (2009) who found that, according to their partners, men with higher mate value were more likely to use benefit-providing mate retention tactics, whereas those of lower value used more cost-inflicting behaviours. These authors suggest that cost-inflicting behaviour represents a high-risk strategy, in that whilst it is designed to prevent a partner from becoming involved with another individual, it may also increase the likelihood of relationship dissolution. A crucial area of future research would be to directly investigate how effective various mate retention and partner investment strategies are in maintaining romantic relationships. Longitudinal studies could ask participants to report on their self-esteem, self-perceptions and mate retention and investment behaviour, and investigate whether these predict the likelihood of the relationship dissolving. The results of such studies would shed light on whether mate retention tactics are effective in maintaining the relationships of individuals with low self-esteem. If negative mate retention tactics are generally effective in maintaining relationships, this would provide evidence supporting sociometer theory, by demonstrating that people with low levels of self-esteem engage in adaptive behaviour which protects their relational status. However, if cost-inflicting mate retention behaviour tends to lead to relationship dissolution, this would indicate that low self-esteem is related to maladaptive behaviour in relationships, challenging sociometer theory.

An important limitation of the current study was that it relied on women's self-reports of their mate retention and partner investment behaviour. Thus, it

cannot be determined whether the observed relationships between these variables and women's self-esteem and self-perceptions represent their actual behaviour, or instead are largely due to response biases. For example, it may simply be the case that women with lower levels of self-esteem are more likely to view their relational behaviour negatively, and thus report engaging in more negative mate retention tactics. Similarly, the observed positive relationships between self-perceived mate value and positive partner investment behaviour may simply reflect the fact that women who perceive themselves favourably in terms of their attributes also view their relational behaviour in the same positive way. Whilst such general response tendencies may explain some of the present results, they cannot account for the observed negative relationship between women's perceptions of their mate value relative to that of their partners and their positive investment behaviour. Moreover, previous research has demonstrated that partners in couples generally agree in their reports of each other's mate retention and investment behaviour (Ellis, 1998; Shackelford et al. 2005), suggesting that self-reports do reflect actual relational behaviour. However, future studies should examine how individuals' self-esteem and self-perceived mate value are related to their partners' reports of their mate retention and partner investment behaviour in order to examine whether the current results reflect actual behaviour.

In summary, the results of the present Study 5 provide only partial support for the hypothesis, derived from sociometer theory, that women with low self-esteem should engage in more behaviour designed to maintain and protect their romantic and sexual relationships. Instead, women's perceptions of their own and their partners' desirability as mates, together with the relative balance between these, seem to be more strongly related to their relationship behaviour.

In short, self-perception seems to be more important than self-esteem in predicting relational behaviour. The implications of this finding are explored in greater detail in the concluding chapter of the present work.

CHAPTER 7

GENERAL DISCUSSION

7.1 Summary of the Present Research

The current work has presented the results of a series of studies designed to test hypotheses derived from sociometer theory. Study 1 examined the hypothesis that self-esteem should be positively related to self-perceived physical attractiveness and extended previous research in this area (See Feingold, 1992, for a review) by incorporating a novel, social comparison measure of self-perceived facial attractiveness together with a multidimensional measure of self-esteem (Shrauger & Schohn, 1995). The results supported this hypothesis, demonstrating significant positive correlations between self-perceived facial attractiveness and self-esteem in both sexes. Furthermore, Study 1 supported the notion that the sociometer system consists of several different modules, each concerned with different domains of relational value and inclusion (Kirkpatrick & Ellis, 2004) by demonstrating that self-perceived attractiveness was more strongly related to attractiveness and romantic self-esteem than other domains of self-worth. In addition, correlations between specific domains of self-esteem and global feelings of self-worth differed between sexes in ways which can be readily explained by a consideration of evolutionary theories of sex differences in market value (Buss, 1989). For example global self-worth in women was most strongly related to self-perceived physical attractiveness, whereas self-esteem in males was more strongly related to self-assessments of athletic and public speaking skills. Thus, the results of Study 1 support the predictions of sociometer theory that self-esteem

should be most strongly related to self-assessments in domains which are especially relevant to individuals' relational value and highlight the importance of mating relationships in this context.

However, although the results of Study 1 were consistent with predictions derived from sociometer theory, the theory states that self-perceptions in relational domains should exert a causal influence on self-esteem. Studies 2 to 4 examined the causal direction of the relationship between self-perceived attractiveness and self-esteem by attempting to manipulate each of these variables to examine whether it affected the other. Study 2 used a social comparison paradigm to attempt to manipulate self-perceived physical attractiveness in women by exposing them to images of highly attractive or unattractive others. The results indicated that this manipulation had no effect on global state or trait self-esteem; nor did it affect any sub-domains of these constructs. These results are inconsistent with sociometer theory, which predicts that changes in self-perceptions in domains relevant to relational value should exert a causal influence on self-esteem. However, Study 2 suffered from several methodological limitations making interpretation of the theoretical implications of these null results difficult, and thus Study 3 attempted to replicate Study 2 incorporating methodological alterations designed to address these limitations. The results of Study 3 indicated that whilst the social comparison manipulation of self-perceived attractiveness did affect this variable, it did not affect any measure of state or trait self-esteem. This was the case regardless of participants' prior levels of contingent self-esteem and self-perceived attractiveness. Thus, Studies 2 and 3 failed to support the hypothesis, derived from sociometer theory, that self-perceived attractiveness should exert a causal influence on self-esteem.

Study 4 assessed whether the relationship between self-perceived attractiveness and self-esteem could be explained by the latter variable exerting a causal influence on the former. Participants were exposed to an implicit priming procedure designed to temporarily increase or decrease their levels of self-esteem, and their subsequent levels of self-perceived attractiveness were assessed using a social comparison measure. The results indicated that participants who were exposed to positive self-esteem primes subsequently reported higher levels of self-esteem and self-perceived physical attractiveness than those who received negative primes. Whilst not necessarily inconsistent with sociometer theory, these results suggest that the relationship between self-esteem and self-perceptions of physical attractiveness may be best explained by a top-down process whereby global feelings of self-worth lead to specific self-evaluations.

Finally, Study 5 examined the hypothesis, derived from sociometer theory, that self-esteem would be associated with relational behaviours and specifically that individuals with lower levels of self-esteem should engage in more efforts to maintain and enhance their romantic relationships. It was also predicted that women's self-assessments of their traits and abilities in a variety of domains relating to their desirability as a romantic partner would relate to the specific strategies which they employed in maintaining and enhancing their relationships. Women who were engaged in long term relationships completed measures of their own and their partner's mate value, their self-esteem and their mate retention and partner investment behaviours. The results supported those of Study 1, by demonstrating that women's self-perceived mate value was significantly positively related to their self-esteem. These results further support sociometer theory by demonstrating that individuals' self-perceptions in

domains which are especially relevant to their relational value are positively related to their levels of self-esteem. However, the results of Study 5 found only very weak support for the hypothesis that self-esteem should negatively predict women's efforts to maintain and enhance their relationships. Instead, women's perceptions of their own and their partners' mate value, and the relative levels of these variables, were more strongly related to and predictive of relational behaviour. The results also suggested that women may employ specific relational maintenance and enhancement behaviours which draw on their self-perceived strengths. Overall, findings from Study 5 did not support the hypothesis, derived from sociometer theory, that self-esteem should exert a causal influence on relational behaviours. Instead, specific self-perceptions may be more important in determining behaviour. These results call into question the notion that self-esteem serves a regulatory function with respect to social relationships, as suggested by sociometer theory. The following sections present a detailed assessment of sociometer theory with respect to the current results and existing research and theories in the literature on self-esteem. However, before turning to this, some limitations of the current samples will be considered.

7.2 Sample Limitations

The present studies, having been conducted on relatively small and circumscribed samples, should be regarded as preliminary investigations. With the exception of Study 1, all of the present work was conducted with exclusively female participants. This decision reflects the fact that observed correlations between self-perceived attractiveness and self-esteem are stronger in women

than in men (Study 1; see also Feingold, 1992 for a comprehensive review); it therefore seemed more profitable to initially further investigate this relationship in women. However, given that self-perceived physical attractiveness does relate to self-esteem in men, an important extension of the current research would involve replicating the present studies with male samples.

Another potential sampling limitation of the current studies is that, with the exception of Study 4, they all used the internet to collect data. Although individual participants' responses have been shown to be equivalent in internet and paper based versions of questionnaires (Ferrando & Lorenzo-Seva, 2005), there may be systematic demographic differences between the individuals who choose to respond to each type of study (see Hewson, Yule, Laurent & Vogel 2003, for a review). In particular, due to differences in patterns of internet usage, online samples may be biased with respect to variables such as level of education and socioeconomic status. However, given that much psychological research relies on undergraduate student samples, it is not likely that these biases differ greatly from those found in the majority of studies. In fact, internet studies may offer some advantages over traditional sampling methods, by for example, offering access to participants of a wider range of ages (Hewson et al. 2003). In addition, although the researcher clearly has less control over the context in which individuals complete online studies, the greater anonymity involved may help to reduce socially desirable responding and the influence of demand characteristics. Online studies have a further advantage in that they allow for the efficient collection of large amounts of data. However, it would be profitable to replicate the current studies using paper versions in order to ascertain whether these obtain similar results.

These potential limitations relating to the use of internet studies also relate to wider issues surrounding the demographic characteristics of the current samples. Although the ages of participants in the current studies demonstrated relatively large ranges, mean values indicate that participants were generally in their early twenties. Previous research suggests that the link between self-perceived attractiveness and self-esteem may vary in participants of different ages (e.g. Brase & Guy, 2004). Furthermore, the contingencies on which individuals base their sense of self-worth may shift throughout the lifespan (Crocker & Wolfe, 2001) and so it would be interesting to replicate the present studies using samples with higher mean ages.

The present samples were also limited with respect to other demographic variables such as educational level and socioeconomic status, due to the fact that they were primarily recruited from populations of university students and staff. Again, such samples are likely to display different contingencies of self-worth to other social groups (Crocker & Wolfe, 2001). Additionally, Section 7.5, below, discusses how individual differences in early childhood experiences of both the social and physical environment may influence the development of self-esteem and social behaviour, and thus it would be interesting to replicate the current studies using samples drawn from wider social groups.

Finally, the present studies were all conducted on participants living in the United Kingdom, and although data on ethnicity and cultural background was not collected, it is safe to assume that almost all of the current participants shared a background common to Western, industrialised societies. There is considerable debate in the self-esteem literature on the extent of cultural differences in the determinants and results of feelings of self-worth (e.g. Sedikides et al. 2005). Sociometer theory, with its emphasis on the evolutionary

adaptive nature of self-esteem, predicts that the basic functions and operations of self-esteem should be largely invariant across cultures. However, there may be considerable variation in the value which different societies place on various socially relevant traits and abilities which, from the perspective of sociometer theory, should moderate the extent to which these influence self-esteem. Therefore it would be important to conduct further studies of the present kind in a variety of cultures in order to more fully examine these issues.

7.3 An Assessment of Sociometer Theory

Collectively, the results of the studies reported here provide mixed support for the sociometer theory of the nature and function of self-esteem. Studies 1 and 5 provide convincing evidence demonstrating a positive relationship between individuals' self-perceptions in domains relevant to their romantic and sexual relationships and their levels of self-esteem. This supports and extends a wealth of previous research indicating that self-esteem is strongly related to individuals' self-perceptions in traits which are especially important in establishing and maintaining interpersonal relationships, and is consistent with the sociometer proposal that self-esteem is designed to monitor individuals' levels of relational value and inclusion (see Leary & Baumeister, 2000 for a comprehensive review). However, in order to accept the sociometer interpretation that self-esteem is an evolved mechanism which responds to cues of social acceptance and relational value to regulate interpersonal behaviour, at least two further assumptions must be supported. First, it must be demonstrated that self-perceptions in interpersonal domains causally affect, rather than simply correlate with self-esteem. The present Studies 2 to 4 do not

support this assumption and instead suggest that observed correlations between these constructs may be better explained by positing a causal influence of self-esteem on self-perceptions. Second, support must be provided for the notion that self-esteem regulates interpersonal behaviour in adaptive ways. Study 5 provides little support for this contention in the area of romantic relationships, instead suggesting that specific self-perceptions may exert a greater influence on relational behaviour than feelings of self-worth. These two issues of causation and the adaptiveness of self-esteem are key to an evaluation of sociometer theory, and are discussed in detail and in relation to current research and theory in self-esteem in the following sections.

7.3.1 Relationships between Self-Perceptions and Self-Esteem

A key question throughout the history of research and theory in the area of self-esteem has been the nature of its relationship with specific self-perceptions. The problem of understanding causal relationships between self-perception and self-esteem partly arises from adopting different definitions of the latter concept. Wells and Marwell (1976) pointed out that traditional definitions of self-esteem tended to focus either on cognitive processes of evaluation or affective processes surrounding positive and negative feelings about the self. For example, for William James (1890/1950) self-esteem was the result of a mechanistic cognitive calculation based on individuals' successes versus their pretensions. On this view, the relationship between self-perception and feelings of self-worth is explained by a bottom-up process whereby the sum of self-evaluations determines overall self-esteem. This perspective places an emphasis on the primacy of cognitive processing, with feelings of self-worth

merely reflecting an affective response to this. Sociometer theory shares this essential analysis that cognitive evaluations of relational value, together with experiences of acceptance and rejection, lead to an affective response (Leary & Baumeister, 2000). However, the theory suggests that the affective response is only meaningful and important in so far as it motivates adaptive behavioural responses to the cognitive evaluative element of the system. Thus self-esteem performs a mediational rather than a primarily causal role in the sociometer system.

In contrast to these bottom-up approaches, several theories throughout the history of research into self-esteem have taken a top-down approach. Such perspectives were popularised by the early therapeutic work of Rogers (1951/2003) based on humanistic movements in Psychology. These approaches view self-esteem as a primarily affective positive or negative attitude towards the self which then causally influences both self-perceptions and behaviour. Instead of explaining self-esteem as an outcome of specific self-perceptive and evaluative processes, top down theories propose that self-esteem is rooted in a sense of unconditional positive regard (Rogers, 1951/2003), authenticity (Kernis, 2003) or in early developmental experiences (Brown et al. 2001).

At present, there is little definitive evidence to favour either a top-down or bottom-up perspective on self-esteem (Mruk, 2006). This is, in part, due to the fact that the overwhelming majority of research into specific self-perceptions and self-esteem is correlational in nature. In fact, almost all of the research in this area simply assumes a top-down or, more often, a bottom-up perspective and thus treats correlations as if they reflect causal relationships in the assumed directions (see Baumeister et al, 2003, for a review). Experimental

research into the relationship between self-perceptions and self-esteem is extremely rare. This may in part stem from the fact that researchers often unquestioningly make theoretically grounded causal assumptions about this relationship, but it is likely also to reflect the ethical and methodological difficulties surrounding manipulating these variables. From an ethical point of view, it is extremely difficult to manipulate self-esteem and self-perceptions in such a way that these manipulations are likely to affect other variables of interest, without at the same time causing potentially serious and lasting psychological harm to participants. Coupled with this is the problem of devising ecologically valid manipulations of these variables in a necessarily artificial experimental context. Consider, for example, studies which examine how experiences of rejection and negative evaluative feedback from others detrimentally affect individuals' levels of self-esteem, which provide a key component of the research evidence supporting sociometer theory (Leary et al. 1995; 1998). These studies examine participants' reactions to rejection and feedback by real or imagined individuals with whom they have had no prior contact. In addition, participants have no clear motivations for forming relationships with these individuals. Whilst it is undoubtedly true that social interactions with strangers are likely to be important, from an evolutionary perspective on the need for interpersonal relationships (Baumeister & Leary, 1995) these are likely to be far less significant than relationships with family members, sexual and romantic partners, friends, colleagues and other members of important social groups. Thus, it is unclear the extent to which these experimental findings can be applied in developing an understanding of how individuals' real world social experiences interact with their self-esteem.

This problem of the personal relevance of social feedback represents a key limitation of the present Studies 2 & 3, which sought to manipulate self-perceptions of attractiveness through a mechanism of social comparison with others. It may be the case that this indirect manipulation was simply not powerful enough to exert a causal effect on women's self-esteem, even if this would be expected from a theoretical standpoint. One of the reasons for this may have been the nature of the comparison targets, who were individuals who were both unknown to and did not share membership of any significant social groups with the participants. Thus, although comparison with these individuals may have affected individuals' cognitive appraisals of their own physical attractiveness (as suggested by the results of Study 3), the low relevance of these comparisons may account for why they did not influence women's self-esteem. In order to examine this, future studies could assess whether highlighting or manipulating perceived attractiveness differences between participants and other members of social groups of direct relevance to them (e.g. friendship groups, students on the same academic program) has an effect on individuals' self-esteem. Significant results would lend support to bottom-up theories of self-esteem, including sociometer theory. However, whilst such studies would address methodological difficulties, they would bring with them attendant ethical issues. This highlights a trade-off often inherent in the design of many social psychological experiments between concerns of methodological rigour and ethical sensitivity.

Another key limitation of both previous experimental studies of self-esteem and the current Studies 2 & 3 is that they rely on the indirect manipulation of variables of interest. Traditionally, researchers have sought to manipulate self-esteem by using "ego threats" which typically provide participants with relatively

negative feedback concerning their performance on an intellectual task (e.g. Brown, 1993a). Often, this is achieved by requiring participants in the experimental threat manipulation group to undertake, without their knowledge, a particularly difficult version of the task so that they obtain especially low scores in comparison to those in the control condition (e.g. Heatherton & Vohs, 2000). However, although researchers typically attempt to stress the relevance of these tests as predictive of success in real life areas such as employment and academic achievement, the extent to which participants consider their performance to be genuinely diagnostic and important is unclear. In addition there is the problem that many participants, and especially those with higher levels of trait self-esteem actively engage mechanisms of “ego defence” in order to minimise the effects of such performance manipulations on their momentary feelings of self-worth (see Blaine & Crocker, 1993). The implications of such defensive processing for sociometer theory are discussed in the following section. Thus, it is particularly difficult to devise direct, explicit manipulations of self-esteem which are both of relevance to participants and are resistant to potential defence mechanisms. These difficulties may account for the relative lack of experimental studies in the area of self-esteem. It was for this reason that Study 4 used an implicit direct manipulation of self-esteem.

These issues surrounding the use of indirect manipulations are also relevant to the social comparison manipulation of self-perceived attractiveness used in Studies 2 and 3 and they may further help to account for the lack of significant effects on women’s self-esteem. It is possible that a more direct manipulation of self-perceived attractiveness, such as taking photographs of participants, informing them that these were rated for attractiveness by others, and then giving them false feedback suggesting that they had received either

very high or low ratings, may affect their subsequent levels of self-esteem. Again, although this might be a more powerful way of manipulating self-perceptions, it would also introduce further ethical concerns. However, even this more direct approach would be vulnerable to participants engaging ego defence mechanisms, for example by simply dismissing the accuracy of negative feedback (see Blaine & Crocker, 1993). Furthermore, research suggests that individuals are motivated to interpret feedback in ways which are consistent with their existing self-concepts (de la Ronde & Swann, 1993). Thus, women may dismiss feedback that is discrepant from their existing level of self-perceived attractiveness, neutralising any possible manipulation effects. In the case of women who initially consider themselves to be highly attractive, this consistency concern might well act in concert with ego defence mechanisms to lead them to dismiss negative feedback. However, in women with low pre-existing levels of self-perceived attractiveness, consistency concerns may lead them to dismiss even positive feedback. Thus, it is not clear whether even this more direct method of attempting to manipulate self-perceived attractiveness would be effective.

One potential way of overcoming these difficulties in devising explicit manipulations of self-esteem and self-perceptions is to use subconscious, implicit manipulations (Riketta & Dauenheimer, 2003; Grumm et al. 2009). These have the advantage of providing a direct means of manipulating specific variables of interest and also bypass individuals' explicit defensive processing mechanisms. It is striking that in the current program of research, the only experimental study which produced significant results, Study 4, utilised an implicit manipulation of self-esteem and demonstrated that this affected explicit self-perceptions of attractiveness. Thus in order to further examine bottom-up

theories of self-esteem, such as sociometer theory, future studies could employ implicit manipulations of self-perceptions, including self-perceived attractiveness, to examine whether these affect self-esteem. The methodology of such studies would directly parallel those of the current Study 4, and thus provide for a more direct comparison between top-down and bottom-up theories of self-esteem than the present studies, with their mixed methods and attendant problems of interpretation of significant versus null results.

In addition to using implicit manipulations, future studies could also benefit from using implicit *measures* of both self-esteem and self-perceptions, such as the Implicit Association Test (IAT: Greenwald & Farnham, 2000). As Baumeister et al. (2003) point out, one of the problems with existing studies on the relationship between self-perceptions and self-esteem is that they rely on self-report measures of these variables. For explicit measures of these constructs, this is a necessary implication of their definitions. Unlike, for example, intelligence, there can be no “objective” measures of self-esteem and self-perceptions; they are necessarily subjective constructs. However, this creates problems with interpreting correlations between self-perceptions and self-esteem, in that often there is considerable overlap between items used to assess these theoretically-separate constructs. This is most apparent with multidimensional measures of self-esteem such as the Personal Evaluation Inventory (Shrauger & Schohn, 1995) used in the present Studies 1-3 and 5. Consider, for example, a typical item from the attractiveness subscale of this measure; “I am pleased with my physical appearance” and the measure of self-perceived physical attractiveness used in the present Study 3, which simply asked participants to rate their level of physical attractiveness on a numerical scale. It can be seen that the only essential difference between these measures

is the addition of an affective response (i.e. being pleased) to the self-perception measure to create the self-esteem item. This follows from traditional conceptualisations of self-esteem which posit that it is an affective evaluation of the self-concept (e.g. Wells & Marwell, 1976). However, from a measurement perspective, it is not clear whether this distinction between cognitive perceptions and affective evaluations is psychologically meaningful to participants, or even attended to by them. Given that, for example, it seems intuitively unlikely that any individual could simultaneously *think* that they were extremely unattractive and yet *feel* extremely pleased about this, it also seems plausible that participants may treat items which are attempting to measure theoretically distinct self-perceptions and self-esteem as if they are the same. This would account for observed correlations between self-perceptions and self-esteem, but it is unclear whether these results represent any meaningful theoretical relationship between the variables.

Although this problem is more acute with multidimensional measures, studies which examine relationships between global measures of self-esteem and specific self-perceptions are also limited by their use of self-reports. As Baumeister et al. (2003) point out, positive correlations between specific self-perceptions and global self-esteem may simply reflect a general positive response bias in participants, rather than any deeper psychological reality. In this regard, it is striking that whilst self-perceptions of physical attractiveness typically demonstrate a strong significant positive correlation with self-esteem, objective, other-reported measures of the former variable do not (Diener et al. 1995; Gabriel, Critelli & Ee, 1994). Since implicit measures of self-esteem and self-perceptions do not depend on self-report, they offer a significant advantage

in this regard, and thus research employing these measures will be invaluable in further investigating the relationships between these variables.

However, although implicit measures offer these methodological advantages, this research strategy brings attendant theoretical problems of interpretation. These in part stem from the fact that currently available implicit measures of self-esteem do not typically demonstrate significant correlations with one another, and do not correlate strongly with explicit measures (Bosson et al. 2000). There is considerable debate about the theoretical significance of these null results, which goes beyond the scope of the present discussion, but such issues will need to be resolved before implicit measures can be confidently used to examine general theories of self-esteem. Nonetheless, it is clear that implicit measures offer an important alternative method of investigating causal theories of self-esteem, and future research would do well to include them.

In addition to using implicit measures and manipulations, another way of potentially addressing the limitations surrounding experimental studies of self-esteem in examining causal hypotheses would be to take advantage of more natural experimental settings. One such approach would involve studying participants in “speed dating” events, where individuals who are interested in meeting potential romantic partners engage in short interactions and then indicate whether they would like to meet each other again. Such studies have numerous advantages for studying relationship-initiation behaviour, including allowing the efficient collection of large amounts of data on people’s stated preferences and their actual behaviour (Finkel & Eastwick, 2008). Furthermore, speed dating studies benefit from a higher degree of external validity than many previous laboratory studies of the effects of interpersonal acceptance and feedback. In relation to the current work, speed dating paradigms could

profitably be employed to examine how experiences of romantic acceptance and rejection affect individuals' self-perceptions and self-esteem. The number of positive responses which individuals' receive from potential partners would serve as a natural manipulation of romantic acceptance and rejection. Since this variable potentially has real implications for an individual's relational status it is likely to be more psychologically meaningful than the laboratory based experimental manipulations described above, and so would provide for a more ecologically valid means of testing whether acceptance and rejection affect self-esteem. Individuals could be required to complete state self-esteem measures both before and after the speed dating event. Results demonstrating that individuals who receive more positive responses show an increase in self-esteem, whilst those who receive negative responses experience diminished feelings of self-worth, would support sociometer theory by indicating that self-esteem is sensitive to romantic acceptance and rejection. Similar studies could be conducted to examine whether romantic acceptance and rejection affects specific self-perceptions of mate value and physical attractiveness. Speed dating paradigms could also be employed to examine whether initial levels of self-esteem exert a causal influence both on individuals' reactions to the acceptance or rejection of others, and also their likelihood of accepting or rejecting others. For example, given that individuals with low chronic levels of self-esteem are generally more sensitive to social feedback (Campbell & Lavalley, 1993), it seems likely that experiences of romantic acceptance and rejection will exert a greater effect on their subsequent levels of state self-esteem and specific self-perceptions. Findings demonstrating this would support top-down theories of self-esteem (Brown et al. 2001). Such results would also be readily interpretable from within the framework of sociometer

theory. The theory suggests that individuals with low self-esteem have lower perceptions of their relational value and status, and thus should be more sensitive to interpersonal rejection, since this reflects a threat to a more limited resource (Rudich & Vallacher, 1999). In contrast, individuals with high self-esteem may be less sensitive to romantic rejection given that they may perceive their ability to attract alternative partners to be higher. Similarly, given that self-esteem demonstrates a strong positive correlation with self-perceptions of mate value (Study 5), from a market value perspective (Pawlowski & Dunbar, 1999), it would be predicted that individuals with higher levels of self-esteem would be more selective in accepting potential partners, and thus give fewer positive responses in speed dating studies. Such results would accord with those obtained by a study of an internet dating site which demonstrated that more attractive individuals are more discriminating (i.e. give fewer positive responses) in their decisions about whether to meet other individuals who are potential romantic partners (Lee, Lowenstein, Ariely, Hong & Young, 2008).

Finally, speed dating studies could examine whether, after controlling for attractiveness and mate value, individuals' self-esteem affects the likelihood that others will accept or reject them. Sociometer theory states that self-esteem should exert a causal influence on interpersonal behaviour (Leary & Baumeister, 2000) and thus initial self-esteem should predict acceptance and rejection in speed dating situations. At present, there is very little research which examines causal effects of self-esteem on interpersonal behaviour, and extant research yields conflicting results (Baumeister et al, 2003, and see next section for further discussion). Speed dating paradigms offer a novel means of studying this relationship in a naturalistic context.

Causal hypotheses can also be tested by examining the time course of changes in self-perceptions and self-esteem in relation to naturally occurring life experiences. For example, demonstrating that initial self-perceptions measured at time 1 predict subsequent self-esteem at time 2, but that self-esteem at time 1 does not predict self-perceptions at time 2 would support a bottom-up perspective on the relationship between these variables, such as that proposed by sociometer theory (Leary & Baumeister, 2000). Such longitudinal studies would enable investigators to estimate the magnitude of any causal effects by examining differences between variables measured at different times. They would also allow the investigation of how real world experiences influence both self-perceptions and self-esteem. From a sociometer perspective (Leary & Baumeister, 2000), experiences relating to interpersonal acceptance and rejection and changes in self-perceptions of relational value should influence self-esteem. Murray, Griffin et al. (2003) asked participants to complete daily reports of their state self-esteem and the extent to which they felt accepted or rejected by their romantic partners. This study found evidence that feelings of acceptance predicted changes in state self-esteem on subsequent days, supporting a bottom-up sociometer perspective. However, this was only true for individuals with low chronic levels of self-esteem (see below for further discussion of this finding in relation to the literature on self-esteem). Similarly, Denissen et al. (2008) used a daily diary study to show that people's perceptions of the quality of their romantic relationship on a given day predicted changes in their self-esteem on the following day. Future studies could profitably employ similar diary report methods to examine daily fluctuations in self-esteem and self-perceptions in relation to interpersonal experiences in individuals who are not in long term relationships. From a sociometer

perspective, it would be predicted that experiences of acceptance and rejection from potential romantic and other social partners, together with interpersonal feedback surrounding traits with special relevance to relational value such as physical attractiveness, would predict subsequent changes in self-esteem.

The findings of the diary study by Murray, Griffin et al (2003) offer important insights with respect to the current discussion of top-down and bottom-up theories of self-esteem. This study found support for both perspectives, in demonstrating that chronic levels of self-esteem influenced participants' interpretations of their partners' interactional feedback and that their sense of acceptance influenced their subsequent levels of state self-esteem. Thus although previous theories of self-esteem have tended to emphasise either a top-down or bottom-up interpretation of the relationship between specific self-perceptions and self-esteem, it seems likely that these processes may coexist, creating a circle of influence. Moreover, recent research suggests that there may be individual differences in the extent to which self-perceptions influence self-esteem, and vice versa. For example Kernis (1993; 2003) has suggested that the stability of individuals' self-esteem may be more important than its absolute level. He suggests that individuals differ in the extent to which experiences of success or failure, acceptance or rejection and interpersonal feedback affect their global self-esteem. Individuals with stable self-esteem are relatively insensitive to feedback, whereas those with a fragile sense of self-worth are hyper sensitive to feedback. Kernis (1993) has demonstrated that the stability of self-esteem is independent of its absolute level and he suggests that "genuine" self-esteem is stable and resistant to interpersonal feedback (Kernis, 2003). Thus, bottom-up processes, whereby specific self-perceptions affect self-esteem may only be prevalent in individuals with a fragile sense of self-worth.

This may explain why studies which only examine absolute levels of self-esteem often find conflicting results with respect to the relationship between self-evaluations and self-worth (Baumeister et al 2003).

Similarly, the concept of contingencies of self-worth (Crocker & Wolfe, 2001) helps to illuminate the issue of individual differences in causal relationships between self-perceptions and self-esteem. This perspective accords with previous bottom-up theories of self-esteem (e.g. James, 1890/1950) in suggesting that an individual's global sense of self-worth is rooted in his or her self-perceptions in domains which he or she considers to be especially important, and these domains are referred to as contingencies of self-worth (Crocker & Wolfe, 2001). Specific contingencies of self-worth show considerable individual variation, such that some individuals may base their self-esteem on their appearance, whereas others may show stronger contingencies relating to a sense of virtue. Thus, although the concept of contingent self-worth is fundamentally a bottom-up theory, it predicts that there will be considerable individual variation in the extent to which specific self-perceptions will influence self-esteem. Moreover, research suggests that there may be individual differences in the overall extent to which individuals' self-esteem is contingent versus non-contingent (Study 3; Patrick et al. 2004). Thus, it may be the case that the extent that the correlation between self-perceptions and self-esteem can be explained by top-down versus bottom-up processes may vary considerably between individuals, and therefore both types of theoretical explanation for this relationship may have merit. The notion that there are individual differences in the extent to which individuals base their overall sense of self-worth on specific contingencies is inherent in several top-down theories of self-esteem (e.g. Rogers 1951/2003; Kernis, 2003). However,

such theories argue that “genuine” or “true” self-esteem is non-contingent and thus not subject to bottom-up influences of self-perceptions. These approaches define self-esteem as being necessarily non-contingent, and thus, whilst they acknowledge that many individuals base their sense of self-worth on specific contingencies, they deny that this results in genuine self-esteem. In contrast, sociometer theory, in common with other top-down theories, requires that self-esteem is contingent, and furthermore argues that interpersonal contingencies are of the greatest importance to individuals’ feelings of self-worth (Leary & Baumeister, 2000). Support for this notion of the universal influence of social feedback on self-esteem comes from research which suggests that even people who report that their feelings of self-worth are unaffected by the approval of others show decrements in state self-esteem in response to negative social feedback (Leary et al. 2003). In addition these people’s perceptions of others’ positive regard for them do predict their levels of self-esteem (Lemay & Ashmore, 2006), suggesting that genuine socially non-contingent self-esteem may be illusory. Nevertheless, the controversy between top-down and bottom-up theories of self-esteem in large part reflects differences in how self-esteem is defined, and highlights the need for greater conceptual clarity in defining this term (see Mruk, 2006).

In summary, although the results of the present research (Studies 2-4) favour a top-down interpretation of the positive relationship between self-perceived attractiveness and self-esteem (Study 1) it is not clear whether these results reflect methodological issues surrounding the manipulation and measurement of these variables. At present there is very little available research which examines causal relationships between specific self-perceptions and self-esteem, and so the literature does not differentially support either top-

down or bottom-up explanations of this relationship (Mruk, 2006). A key premise of sociometer theory is that self-perceptions in social domains causally affect self-esteem (Leary & Baumeister, 2000) but this has not yet been empirically supported. In order to establish the validity of sociometer theory, future research needs to build on the present studies by attempting to go beyond assessing correlations between self-perceptions and self-esteem and instead focus on testing causal hypotheses surrounding this relationship. Due to the methodological and ethical challenges in designing studies in this area it is recommended that future studies take advantage of natural experimental situations and implicit measures and manipulations of both self-perceptions and self-esteem. In addition, longitudinal studies will be invaluable in developing an understanding of how significant life experiences contribute to both specific self-perceptions and a global sense of self-worth.

7.3.2 Is Self-Esteem Adaptive?

As previously discussed, according to sociometer theory, self-esteem is an evolutionary adaptation designed to monitor individuals' relational status and value, and motivate individuals who perceive themselves to have deficits in these areas to take action to improve their situation (Leary & Baumeister, 2000). Thus the theory posits that self-esteem processes social information from the environment and uses the results of this processing to guide behaviour. In order to support the theory, at least two things must be empirically demonstrated. First, in order to act as an effective social monitor the self-esteem system should process inputs in such a way that it produces the most accurate assessment of the individuals' relational status and value possible. Second, the

system should then use this information to motivate appropriate behaviour. These two propositions will be discussed in relation to the present studies and the research literature on self-esteem in the following sections.

7.3.3 Is Self-Esteem an Accurate Social Monitor?

In explaining their rationale for developing sociometer theory, Leary and Baumeister (2000) state that traditional theories of self-esteem focused primarily on how individuals seek to maintain and enhance their feelings of self-worth without considering the functional significance of this “self-esteem motive”. Sociometer theory states that self-esteem is not of primary importance in itself, but instead mediates the relationship between social feedback and behavioural responses. Thus Leary and Baumeister (2000) argue that people should not directly seek self-esteem, but instead should be motivated to behave in ways which result in their receiving positive social feedback which in turn leads to the positive affective rewards associated with high self-esteem. One of the biggest challenges to sociometer theory comes from the wealth of research on the self-esteem motive which seems to indicate that individuals are in fact primarily concerned with protecting and enhancing their self-esteem (see Sedikides & Gregg, 2008 for a recent review), and that they often do this in ways which preclude them from accurately evaluating social feedback.

Research consistently demonstrates that most people have pervasive positive illusions about their traits and abilities, judging themselves more positively than would be warranted by objective evidence (see Taylor & Brown, 1988 and Alicke & Sedikides, 2009 for reviews). One well known example of this positivity bias is the *better than average effect* whereby the vast majority of

individuals consider themselves to have greater positive, and fewer negative, qualities than “the average individual”, in defiance of statistical logic (see Sedikides & Gregg, 2008). So pervasive is this effect that it occurs even in individuals who are suffering from depression (Pelham, 1993), who are generally assumed to have exclusively negative self-evaluations. Furthermore, these positive illusions persist even when individuals are explicitly made aware of their existence, and ironically people typically believe themselves to be less susceptible to such biases than are others (see Pronin, Gilovich & Ross, 2004). Even unambiguous objective evidence is often insufficient to overcome these evaluative biases. For example, drivers who have been hospitalised as a result of their poor driving, in common with other motorists, regard themselves as being near expert drivers (Preston & Harris, 1965).

Of particular relevance to the present work, there is also evidence demonstrating that positive self-perceptual and evaluative biases, such as those apparent in the better than average effect, may extend to individuals' assessments of their romantic desirability and physical attractiveness. For example, Preuss and Alicke (2009) conducted a study in which participants were required to produce short videotaped dating profiles of themselves. Participants then viewed a series of profiles of same sex others, and were asked to place these, together with their own profile, in rank order of romantic desirability. The results demonstrated that individuals of both sexes ranked their own profiles significantly higher than did independent observers, showing a clear self-enhancement effect. Furthermore, they also believed that others would rank them more highly than they were in fact ranked by observers. This study indicates that individuals may believe themselves to be considerably more romantically desirable than the objective evidence would suggest. Furthermore,

there is evidence to suggest that such self-enhancement effects may partly reflect automatic or implicit biases in self-perception. Epley and Whitchurch (2008) conducted a series of studies using facial photographs of participants which had been digitally manipulated to look either more or less attractive by morphing them together with highly attractive or unattractive images. When presented with a line-up of faces and asked to identify their true, non-manipulated image, both male and female participants were significantly more likely to choose an image of themselves which had been made more attractive than to choose either an unattractive manipulation or their actual face. Furthermore, when asked to choose an image of themselves out of an array of distracter faces of other individuals, participants were significantly faster to identify an image of themselves which had been made more attractive, compared to non-manipulated or unattractively manipulated images of themselves. This suggests that this positive bias may operate at an implicit level of processing. These studies also demonstrated that the magnitude of these enhancement effects were positively correlated with participants' levels of implicit, but not explicit, self-esteem. This research seems to demonstrate that most individuals literally perceive themselves to be more physically attractive than they really are.

The prevalence of these perceptual and evaluative biases presents significant problems for sociometer theory. The theory predicts that self-evaluations in socially relevant domains are monitored by the sociometer system in order for it to make an overall assessment of the individuals' level of relational inclusion and value, and in turn motivate adaptive behaviour (Leary & Baumeister, 2000). It seems likely that systematic inaccuracies in specific self-perceptions and evaluations, such as those exemplified by self-enhancement

effects, will reduce the extent to which an accurate overall assessment of relational inclusion and value can be made and thus reduce the utility of this in guiding adaptive behaviour. Sociometer theory, with its emphasis on the functional and adaptive nature of self-perceptions and self-esteem would suggest that self-perceptions should be largely accurate (allowing for some individual and situational variance). With respect to physical attractiveness, the self-enhancement research reported above, together with research reviewed in Chapter 1 demonstrating very small or insignificant correlations between self and observer ratings of this variable (e.g. Santor & Walker, 1999; Gabriel et al. 1994), suggests that individuals either cannot, or do not, accurately assess their level of physical attractiveness.

In addition to affecting individuals' self-perceptions and evaluations, the self-esteem motive also seems to influence the way in which individuals seek feedback about their traits and abilities. Sociometer theory predicts that individuals should generally seek the most accurate feedback possible concerning their social attributes, in order that the self-esteem system can use these to make an accurate appraisal of their levels of relational inclusion and value, and motivate adaptive behaviour. However, research demonstrates that individuals often instead seek feedback which will allow them to view themselves in the most positive ways possible and so feedback choices are often self-enhancing (Brown, 1990). These competing accuracy and enhancement motives in seeking feedback are also evident in social comparison processes. Although Festinger (1954) suggested that individuals primarily compare themselves to others in order to gain accurate feedback about their abilities, subsequent research has indicated that people often choose instead to make downward social comparisons in an attempt to

enhance their positive self-perceptions (see Wills, 1981). Crucially for the current analysis, Sedikides (1993) conducted a series of experiments demonstrating that individuals most often choose self-enhancing, rather than accurate feedback.

The motivation to enhance and protect feelings of self-esteem also influences how individuals typically respond to negative feedback. As previously discussed, individuals often engage ego defence mechanisms to diminish or negate the impact of negative feedback on their self-perceptions. Such mechanisms can involve dismissing the accuracy and validity of the feedback, derogating its source or other people in general, dismissing the importance of the domain of the negative feedback and attributing the negative outcome to external or temporary causes (Blaine & Crocker, 1993). In addition, individuals typically show greater recall for positive versus negative feedback (Sedikides & Gregg, 2008). All of this evidence points to the conclusion that people demonstrate a powerful motive to perceive themselves in a positive light, and that this often overrides concerns surrounding the accuracy of self-evaluations.

Leary and Baumeister (2000) introduce sociometer theory as an alternative to previous theories of self-esteem, which suggest that individuals seek high self-esteem for the affective benefits that feeling good about oneself confers. They state that these approaches ignore the functional significance of self-esteem and that affective consequences of self-esteem are not the primary motivation but instead reflect its function in regulating interpersonal behaviour. The considerable evidence on self-enhancement effects, briefly reviewed here, however, suggests that individuals do seem to be directly motivated to seek high self-esteem, often by distorting objective evidence to serve this self-enhancement motive. Leary and Baumeister (2000) discussed the self-

enhancement motive, and Leary (2004) acknowledged that circumventing the sociometer system in this way is likely to be maladaptive. However, Leary and Baumeister (2000) suggested that self-enhancement processes represent the sociometer system becoming “functionally autonomous” in a small number of individuals. They state that these individuals become more concerned with the positive affective benefits of protecting and enhancing their self-perceptions and self-esteem, and in so doing sacrifice the functionality of the sociometer system in monitoring relational value and status, and therefore guiding adaptive behaviour. They even go so far as to compare excessive self-enhancement behaviour to drug abuse, by stating that both phenomena represent individuals deliberately bypassing what were initially regulatory mechanisms to directly access the affective rewards associated with the normal functioning of these systems. When considered in relation to the wealth of available literature on the self-esteem motive outlined above, this argument seems unconvincing. Instead of describing the behaviour of just a minority of individuals, self-enhancement motives appear to be widespread and universal across cultures (Sedikides et al. 2005) and even occur in individuals suffering from depression (Pelham, 1993). It does not, therefore, seem satisfactory to explain such behaviour as an aberration in a minority of individuals.

Nevertheless, although self-enhancement effects appear to occur in the majority of individuals in certain situations, there does appear to be a considerable degree of variation in the extent to which individuals engage in self-enhancement. Of particular importance to the present discussion, research demonstrates that self-enhancement processes are significantly more prevalent in individuals with high versus low levels of trait self-esteem (see Brown et al. 2001; Taylor & Brown, 1988). This suggests that people with low self-esteem

may be more inclined to perceive themselves accurately and respond to negative feedback by lowering the positivity of their self evaluations.

From the perspective of sociometer theory, these self-esteem differences in self-enhancement biases suggest that individuals with low self-esteem may more accurately and sensitively respond to social feedback than those with high self-esteem. This is at least partially consistent with the theory, in that individuals with low self-esteem have a lower sense of social inclusion and so should be more sensitive to potential threats to this limited resource (Heatherton & Vohs, 2000). However, sociometer theory, in its current form, cannot explain why individuals with high self-esteem often seem to actively discount negative interpersonal feedback in order to maintain their feelings of self-worth and positive self-assessments. This self-enhancement behaviour suggests that these individuals are more concerned with maintaining a positive evaluation of themselves than accurately incorporating interpersonal feedback. This does not accord with sociometer theory, which suggests that individuals should not directly seek self-esteem, but instead should be primarily concerned with adaptively regulating their social relationships. By dismissing or overriding relevant social feedback, it seems that the sociometer is not behaving as expected in individuals with high self-esteem. Suggestions for ways in which the self-enhancement literature might be incorporated into a somewhat modified version of sociometer theory are made in Section 7.4 below, but before this, the issue of whether there is evidence to support the hypothesis that self-esteem regulates behaviour will be examined.

7.3.4 Does Self-Esteem Motivate Adaptive Behaviour?

Sociometer theory predicts that low self-esteem should motivate adaptive interpersonal behaviour. Evidence supporting this prediction is provided by experimental studies which demonstrate that individuals with low levels of self-esteem are perceived as being more likeable by interaction partners in response to an ego threat (Heatherton & Vohs, 2000; Vohs & Heatherton, 2001). This research provides indirect evidence that when presented with threats to their sense of self-worth, people with low self-esteem may attempt to behave in pro-social ways which enhance their relational value and inclusion. However, it is not clear whether these laboratory studies reflect a general tendency of individuals with low self-esteem to behave more pro-socially in real world situations. In fact, traditional conceptions of self-esteem prevalent in the behavioural sciences suggest that low self-esteem is a major cause of a variety of negative or socially damaging behaviours, including crime and violence, teenage pregnancy, poor academic performance, welfare dependency, and alcohol and drug use (see Mecca et al. 1989 for a review). Although it might seem that this view is incompatible with the notion that low self-esteem is evolutionarily adaptive, this is not necessarily the case. From an evolutionary point of view, psychological adaptations must have conferred some kind of advantage in fitness (i.e. number of descendants in future generations) in the environment of evolutionary adaptedness (EEA; the statistical average of social and environmental conditions in which humans have historically lived: Tooby & Cosmides, 1990). Because modern industrialised societies consist of social and ecological conditions that are likely to differ greatly from the EEA, psychological adaptations such as self-esteem (from a sociometer perspective) may in fact be

maladaptive in current environments. Consider, for example, the posited link between low self-esteem and alcohol and drug abuse. Leary and Baumeister (2000) suggest that these behaviours may represent an attempt by individuals with low self-esteem to use these substances to mask the negative affective experiences associated with low feelings of self-worth. Although there does not seem to be available data to support this, it is at least plausible that individuals who abuse these substances may leave fewer descendants in subsequent generations, and thus these behaviours would be maladaptive in the present environment. However given that these substances may not have been widely available in the EEA, it does not follow that any observed link between low self-esteem and alcohol and drug abuse contradicts the notion that self-esteem is an evolutionary adaptation. Similarly, academic performance and welfare dependency are issues that have exclusive relevance to modern industrialised societies, so the question of whether they relate to self-esteem has little relevance for assessing whether or not the latter represents an evolutionary adaptation.

The apparent contradiction between traditional social scientific (e.g. Mecca et al. 1989) and sociometer perspectives on the relationship between low self-esteem and “negative” behaviours can be further understood in terms of differences between *socially dysfunctional* and *evolutionarily maladaptive* behaviours. Whilst violence and teenage pregnancy may be damaging for modern societies, they are not obviously maladaptive in an evolutionary sense. In fact, evolutionary psychologists have convincingly argued that historically the use of violence may have conferred significant fitness advantages on its perpetrators (e.g. Archer, 2009; Daly & Wilson, 1988). Similarly teenage pregnancy may reflect an optimal fitness maximising reproductive strategy for

certain individuals in specific environments (Del Giudice, 2009; see Section 7.5 below for further discussion of how self-esteem might relate to reproductive decision making).

The present discussion of these issues is motivated by the fact that although Leary and Baumeister (2000) state that self-esteem is a psychological adaptation, they do not consider specific issues surrounding the effects of the sociometer system on reproduction and evolutionary fitness. Whilst the present work, following Kirkpatrick and Ellis (2004), considers these issues in somewhat more detail, further theoretical development is needed to specify exactly how the sociometer system might confer benefits in terms of reproductive fitness, as opposed to simply social success, if the notion that self-esteem is a psychological adaptation is to be accepted.

Returning to the consideration of the relationship between self-esteem and behaviour, currently available research suggests that there is no consistent evidence to suggest that self-esteem reliably predicts behaviour outside laboratory contexts (see Baumeister et al, 2003, for a comprehensive review). The data supporting this conclusion is so robust that even exponents of the “self-esteem movement”, who are politically committed to improving self-esteem as a means of improving behaviour, have accepted it (Mecca et al. 1989). Studies examining the link between self-esteem and another given variable typically yield inconsistent results, and Baumeister et al (2003) suggested that the only consistent relationship apparent in the literature is between self-esteem and positive affectivity (which is consistent with both sociometer and most other theories of self-esteem). Furthermore, even studies which do seem to establish relationships between self-esteem and behavioural variables (e.g. school achievement) do not establish the causal direction of these relationships and so

cannot directly support the suggestion that self-esteem guides adaptive behaviour. It is clear that more research in this area, particularly using longitudinal studies of how self-esteem relates to specifically interpersonal behaviour, is needed to support the suggestion from sociometer theory that self-esteem guides adaptive social behaviour in real world contexts.

With respect to laboratory studies of the relationship between self-esteem and social behaviour, the results of previous research seem to be partially consistent with a sociometer theory perspective. The most relevant of these studies to the current discussion typically involve examining how participants with different levels of self-esteem vary in their social responses to ego threats. This research indicates that individuals with low self-esteem may react to ego threats by attempting to increase their attractiveness to others (Heatherton & Vohs, 2000; Vohs & Heatherton, 2001). In addition, it has been shown that individuals with low self-esteem often employ defence and enhancement mechanisms which emphasise the positive characteristics of their relationships with others and their memberships of favoured groups (see Brown, 1993b). This has often been interpreted as evidence that individuals with low self-esteem, lacking rich positive self-concepts to draw on, instead utilise indirect strategies of self-enhancement, emphasising their connections with favoured groups. However, these findings are also compatible with a sociometer theory perspective, which would suggest that these low self-esteem individuals are perhaps attempting to primarily maintain and enhance their relational and inclusionary status in response to a relatively negative reading of this provided by the self-esteem system. Similarly Tice (1993) summarises the available research evidence to conclude that individuals with low self-esteem are primarily motivated to avoid negative social outcomes, such as humiliation and

rejection, rather than engaging in self-aggrandizing behaviours. Thus, despite the null results of Study 5, it does seem that individuals with low self-esteem may be motivated to increase their level of relational value or inclusion, supporting sociometer theory (Leary & Baumeister, 2000).

In contrast to individuals with low self-esteem, those with high self-esteem often seem to behave in ways which may actually lower their level of relational inclusion, particularly in response to ego threats. Studies demonstrate that individuals with high self-esteem are perceived by raters as being less likable following an interpersonal threat than those with low self-esteem (Heatherton & Vohs, 2000; Vohs & Heatherton, 2001). This may reflect the fact that individuals with high self-esteem are more likely to employ ego defence mechanisms which involve derogating others or even responding to ego threats with direct physical aggression (e.g. Vohs & Heatherton, 2004; Bushman et al, 2009).

Thus the available evidence suggests that individuals with low self-esteem respond to ego threats by attempting to enhance their sense of relational inclusion. In contrast, individuals with high self-esteem seem to be more concerned with maintaining their sense of superiority, and they may employ strategies which may actually damage their relationships in order to do this. This pattern of results is at least partially consistent with sociometer theory. The theory suggests that self-esteem serves to regulate social behaviour such that individuals maintain at least a minimal level of social inclusion (Leary & Baumeister, 2000). Individuals with low self-esteem have chronically lower perceptions of their inclusionary status; they consider themselves to have fewer and less high quality relationships, and also perceive themselves to be less eligible for such relationships than individuals with high self-esteem (Leary et al. 1995). Thus, since self-esteem reflects relational inclusion, when individuals

with low self-esteem experience a drop in self-esteem in response to an ego threat, they (perhaps subconsciously) interpret this as indicating a threat to their already fragile inclusionary status, and are thus motivated to attempt to counter this by engaging in behaviours which are likely to protect or enhance their relationships. In contrast, individuals with high self-esteem may be less motivated to protect and enhance their relationships in response to ego threats since they have a stronger sense of relational inclusion and thus slight decreases in this are less threatening to their perceived ability to maintain a minimal level of inclusion. All of this is consistent both with the experimental data and with sociometer theory. However, the theory, in its current form, cannot explain why individuals with high self-esteem may engage in self-aggrandising or aggressive or derogatory ways towards others; why would they engage in behaviours which may damage their relationships? In short, sociometer theory, by suggesting that self-esteem solely functions to protect and enhance social relationships, cannot explain why individuals with high self-esteem often seem to seek the former at the expense of the latter.

7.4 An Extension of Sociometer Theory

Traditional theories of self-esteem which emphasised its (often presumed) relationships with positive affectivity and behaviour struggled to provide adequate explanations of the phenomenon of low self-esteem (see Baumeister, 1993 for discussion). Given that high self-esteem seemed to be linked to positive illusions, which were themselves linked to happiness and mental health (Taylor & Brown, 1988), it seemed difficult to explain why some individuals would have pervasive and seemingly dysfunctional negative views of

themselves. Sociometer theory addressed this difficulty by stating that self-esteem was not of primary importance in itself, but instead mediated the relationship between individuals' sense of social inclusion and their behavioural efforts to enhance and maintain this (Leary & Baumeister, 2000). Thus the negative affective consequences of low self-esteem, whilst unpleasant, were in fact adaptive in motivating functional social behaviour. However, whilst sociometer theory provides an adequate explanation of the phenomenon of low self-esteem, the evidence reviewed in the preceding sections suggests that in its present form, the theory struggles to explain the motives and behaviour of individuals with high self-esteem. Sociometer theory suggests that the self-esteem system functions to monitor relational inclusion and value and motivate adaptive social behaviour (Leary & Baumeister, 2000). The evidence reviewed in the previous sections suggests that individuals with high self-esteem often disregard or discredit negative (but potentially valuable and diagnostic) social feedback, and behave in ways which may be damaging to their level of social inclusion, seemingly to protect and enhance their existing positive self-views. In short, sociometer theory cannot account for why the self-esteem motive seems to have replaced a motivation towards optimising social inclusion in individuals with high self-esteem.

These difficulties stem largely from the emphasis which Leary and Baumeister (2000) placed on social inclusion and cooperative relationships in their exposition of sociometer theory. However, as Kirkpatrick and Ellis (2004) pointed out, adaptive challenges surrounding social relationships cannot simply be reduced to problems of inclusion and acceptance. In addition to wanting to be liked and accepted by others, individuals also strive to compete with and achieve superiority over their peers (Lund, Tamnes, Moestue, Buss & Vollrath,

2007). As discussed in Chapter 1, several previous theories of self-esteem have linked it to a sense of dominance or social status over others (e.g. Barkow, 1989; Maslow, 1937). Leary and Baumeister (2000) acknowledged these theories, but suggest that the relationship between social status and dominance and self-esteem can be explained in terms of high status individuals being less likely to be excluded from groups. Thus they reduce status striving to a general motivation for social inclusion. A suggestion arising from the current work is that cooperative motives towards social inclusion and competitive strivings for dominance and status reflect different social motives which are both regulated by the self-esteem system. It is further suggested that the motive for social inclusion is more basic, in the sense that individuals need to maintain a minimal level of social inclusion to aid survival (Baumeister & Leary, 1995). This motive is of primary concern to individuals with low self-esteem, who perceive their inclusionary status to be relatively low and fragile (and thus more in danger of falling below a minimal acceptable level), and are thus more sensitive to social feedback and motivated to maintain and enhance their relationships. However, when this more basic need is satisfied, individuals may then more aggressively pursue social status and dominance over others. This would explain the behaviour of individuals with high self-esteem, who perceive their inclusionary status to be relatively high and secure (Leary et al, 1995) and thus become more concerned with competing with and asserting their dominance and superiority over others. Thus it is suggested that the self-esteem system serves to initially satisfy a basic need for social inclusion as suggested by sociometer theory (Leary & Baumeister, 2000). When this is achieved, the system then functions to motivate the maximisation of social status. This theory that social motivations towards inclusion are more basic and fundamental than those

concerning status and dominance goes back to Maslow's (1954/1987) hierarchy of needs in which "social" needs concerning love and acceptance are at a lower level than "esteem" needs for social status and recognition. However, where Maslow considers self-esteem to be a need in itself, in the present theory it is suggested that it instead serves to regulate a range of different social needs.

Whilst this theory that greater self-enhancement in individuals with high self-esteem might reflect their efforts to compete for superior status is consistent with the evidence reviewed so far, the question arises as to just how self-enhancements might serve to help increase social status. It seems likely that self-enhancement may often be employed as a self-presentational strategy designed to favourably manipulate the impressions of others (Baumeister & Jones, 1978; Baumeister, 1982). By presenting themselves in the most self-enhancing way possible, individuals may well be able to convince others of their competence and superiority (though not necessarily their likeability). Evidence supporting this self-presentational interpretation of self-enhancement effects comes from studies demonstrating that self-enhancement behaviours may be moderated by the extent of the presentation targets' prior knowledge about participants (Baumesiter & Jones, 1978) and expectancies about future interactions (Baumeister, 1982). Thus, individuals with high self-esteem appear to make strategic judgements about the likely effectiveness of self-enhancing behaviours in manipulating the impressions of others, and they act accordingly. Further evidence for the strategic nature of self-enhancement comes from studies which demonstrate that individuals with high self-esteem employ self-deprecating rather than enhancing self-presentational strategies when others' positive perceptions of their competence will lead to their having to perform an onerous task (Kowalski & Leary, 1990).

It is important to note that the prevalence of self-enhancement processes in individuals with high self-esteem need not always reflect an exclusively conscious self-presentational strategy. In order to convince others of their worth and superiority, it seems plausible that it might be beneficial for individuals with high self-esteem to genuinely believe their own self-enhancing reactions to ego threats. Unfortunately, previous studies of how individuals react to ego threats have used self-report measures of individuals' subsequent self-evaluations and attributions (see Blaine & Crocker, 1993, for a review) which themselves may represent self-presentation processes directed towards the experimenters. Future studies could profitably employ both implicit (e.g. IAT; Greenwald & Farnham, 2000) and explicit measures of individuals' self-evaluative responses to ego threats to examine whether self-enhancement reflects a purely "surface" self-presentational strategy, or whether individuals with high self-esteem have a deeper, automatic resistance to negative feedback.

Whilst presenting the self in enhancing ways might offer interpersonal benefits in terms of improving perceived status it carries with it attendant risks of alienating others who may react negatively towards such self-aggrandizing behaviour (Heatherton & Vohs, 2000). Thus self-enhancement may be a potentially high risk, high reward presentational strategy; the potential rewards in terms of perceived status are balanced by the risks of interpersonal rejection. For individuals with high self-esteem, who perceive their inclusionary status to be relatively secure (Leary et al 1995), it may be adaptive to risk a portion of this in the pursuit of higher competitive status. However, since individuals with low self-esteem perceive their level of social inclusion to be relatively low and fragile, they may be unwilling to risk rejection (Anthony, Wood et al. 2007) for the potential status rewards of employing self-enhancing self-presentations.

This analysis is consistent with research suggesting that individuals with high self-esteem adopt a self-enhancing interpersonal style, whilst those with low self-esteem are more concerned with self-protection (see Baumeister, Tice & Hutton, 1989 for a review).

Future studies could examine predictions based on this modification of sociometer theory. For example, it might be possible to experimentally manipulate participants' sense of their level of social inclusion, using either priming or group allocation techniques (e.g. Leary et al, 1995) to examine whether this affects their willingness to employ self-enhancing presentational strategies. If experimentally increasing individuals' sense of inclusion to high levels leads to more self-enhancement, this might support the theory that competitive status seeking social motives may supplant inclusionary motives in individuals with high self-esteem. Similarly, longitudinal studies could examine whether everyday experiences of social inclusion and exclusion lead to increases and decreases in self-esteem and subsequent changes in the balance between self-protective and self-enhancing presentational strategies.

To summarise, it is argued here that whilst sociometer theory, with its emphasis on social inclusion, can readily explain the social motives and behaviour of individuals with low self-esteem it cannot adequately explain the self-aggrandising tendencies of those with high self-esteem. However, if it is assumed that the sociometer system more generally regulates social behaviour, and is thus concerned with competition in addition to cooperation between individuals, then the self-enhancing evaluative and behavioural biases most commonly seen in individuals with high self-esteem can be more readily understood. Both sociometer theory and the present modification share the perspective that individuals' sense of their level of social inclusion is key to both

their self-esteem and their social behaviour. However, given the current paucity of evidence linking self-esteem to objective social status (Baumeister et al 2003) it is puzzling where this sense of social inclusion originates. The next section will present arguments that developmental processes which shape individuals' expectations about the social environment may be key to understanding self-esteem.

7.5 Self-Esteem, Attachment and Life History Strategies

Although Leary and Baumeister (2000) present convincing evidence to support the notion that self-esteem relates to the extent to which individuals feel socially accepted and included, they provide far less evidence to suggest that self-esteem is related to actual levels of social inclusion. In fact, in their extensive review of the literature, Baumeister et al. (2003) found little evidence to support the notion that self-esteem reflects objective measures of social inclusion or acceptance. Thus self-esteem appears to be more strongly related to individuals' *expectations* about how others will typically respond to them, rather than any objective criteria of social inclusion. In order to understand self-esteem, it seems especially important to understand where these relational expectations originate.

Several top-down theories of self-esteem assume that an individual's sense of self-worth develops from their early childhood experiences (e.g. Kernis, 2003; Brown et al. 2001). From the current sociometer perspective, which assumes that self-esteem is intimately linked to interpersonal functioning, an obvious link could be made between self-esteem and attachment theory (Bowlby, 1969/1997). Attachment theory is fundamentally concerned with how individuals

develop expectations surrounding their relationships with others. In emphasising the importance of interpersonal relationships for psychological functioning, it is similar to a sociometer theory perspective on the nature and function of self-esteem. Modern attachment theory perspectives typically characterise individuals as varying in the extent to which they worry about interpersonal rejection (anxiety) and are uncomfortable with intimate and close relationships (avoidance) (e.g. Collins, Ford, Guichard & Allard, 2006). Thus individuals develop working models of the relationships between the self and others that originate in early interactions with care-givers (Bowlby, 1969/1997) but are also continually modified by interpersonal experiences throughout the lifespan (Mikulincer & Shaver, 2007). Individuals are classified as having one of four particular attachment styles depending on their levels of anxiety and avoidance. Clearly, the concept of attachment anxiety, concerning as it does expectations of acceptance and rejection by others, should be directly related to an individual's level of self-esteem, from a sociometer perspective. Consistent with this, research demonstrates that secure attachment styles (low anxiety and low avoidance) are associated with higher levels of trait self-esteem (see Foster, Kernis & Goldman, 2007, for a review).

Incorporating attachment theory into a sociometer perspective on self-esteem may help to resolve the debate between top-down and bottom-up theories of self-esteem discussed in Section 7.3.1. It is suggested that early childhood experiences with caregivers may lead to a secure attachment style and thus a general expectation of acceptance by others. From a sociometer perspective, this general feeling of acceptance should then lead to high self-esteem. This process of specific assessments and feelings of acceptance leading to self-esteem represents a bottom-up process which accords with the

sociometer view that self-esteem is fundamentally based on feeling socially included. However, these internal working models of securely attached (and thus high self-esteem) individuals, which involve general expectations that the individual will be accepted by others, may then guide their subsequent interpretation of individual experiences in self-protective ways, reflecting top-down processing. Since individuals with high self-esteem may have a secure sense of acceptance rooted in early childhood experiences, they may be more resistant to the negative affective and evaluative consequences of subsequent interpersonal rejection. In contrast, individuals with low self-esteem are more likely to display anxious attachment styles (see Foster et al. 2007 for a review) and are therefore less certain that they will be accepted by others. They are thus more sensitive to interpersonal rejection and negative feedback carrying implications for their level of relational value. However, although generally stable, both self-esteem (Robins & Trzesniewski, 2005) and attachment styles (Mikulincer & Shaver, 2007) can change throughout the lifespan in response to major or repeated positive or negative interpersonal experiences and so bottom-up processing may still occur. This perspective can account for why individuals with low levels of trait self-esteem seem to be more affectively sensitive to bottom-up effects of interpersonal feedback on their state self-esteem (see Baumeister, 1993 for a review).

A study by Srivastava and Beer (2005) investigated the relationship between attachment styles, self-evaluations and individuals' reactions to interpersonal acceptance. Participants initially completed measures of their attachment style and then attended four weekly sessions in which they interacted with individuals who were initially strangers. After each session, participants indicated the extent to which they liked each other member of their

group, and also the extent to which they considered themselves to be a likeable person. The findings supported the operation of bottom-up processes such that, after controlling for initial self-perceived likeability at time 1, measures of the extent to which others liked individuals predicted their self-perceived likeability at time 2. This supports a sociometer theory perspective that the reactions of others are important in shaping self-evaluations. Future studies could profitably employ a similar methodology to examine whether others' reactions also predict changes in individuals' self-esteem, as would be predicted by sociometer theory. Srivastava and Beer (2005) also found that the effect of others' liking on self-evaluations was mediated by individuals' attachment styles. Specifically, individuals high in attachment anxiety experienced significantly stronger effects of others' liking on their self-evaluations. In contrast, the self-evaluations of individuals with low levels of attachment anxiety were unaffected by others' perceptions of them. These results demonstrate a top-down process whereby individuals' typical expectations about social acceptance affected their reactions to specific interpersonal experiences. Again, it would be interesting to examine whether initial levels of trait self-esteem moderate individuals' reactions to such interactions with others in the same manner as attachment anxiety. It would be predicted that individuals with high self-esteem, who are generally secure in their sense of social acceptance (Leary & Baumeister, 2000) may be relatively insensitive to the extent to which other individuals like them in such short term contexts. However, it would also be interesting to study whether over a longer time-span, others reactions do begin to affect self-evaluations and self-esteem.

By attempting to integrate Sociometer and attachment theory perspectives, Srivastava and Beer (2005) have laid the foundations for a profitable area for future research. In relation to the present work, it would be interesting to

examine how attachment styles and pre-existing levels of trait self-esteem might influence the relationship between attractiveness and state self-esteem. For example, in Studies 2 and 3, the lack of evidence that self-perceived attractiveness affected self-esteem may have arisen partly because participants had low levels of attachment anxiety. Having positive expectations about the extent to which others will accept them into intimate relationships, securely attached individuals may be relatively insensitive to temporary changes in their self-perceived attractiveness. In general, it would be profitable to extend research into the relationship between self-esteem and attachment processes from a sociometer perspective. In particular, currently available studies on this relationship typically employ a cross-sectional approach whereby current attachment styles are examined in relation to self-esteem (e.g. Feeney & Noller, 1990). Such studies cannot examine possible causal influences between attachment styles and self-esteem, and in addition are limited by their exclusive use of self-report measures. Longitudinal studies examining whether, and exactly how, early attachment affects adult self-esteem, would be invaluable in testing the current suggestion that working models of interpersonal relationships developed in infancy might contribute to the calibration, in terms of both level and sensitivity, of the sociometer system.

Another way in which attachment theory may inform the evolutionary, adaptive perspective on self-esteem espoused by sociometer theory is through its association with research and theory in the area of *life history strategies* (Belsky, Steinberg & Draper, 1991). In Bowlby's (1969:1997) original exposition of attachment theory, he outlined how the attachment system might form a component of a more general adaptive developmental system designed to form expectancies about both the physical and social environment and adaptively

guide subsequent behaviour. Life history theory draws on this key insight by suggesting that individuals may use early experiences to guide the specific reproductive strategies which they employ as adults (see Del Giudice, 2009, for a recent review). In particular individuals who develop in poor or unstable physical or social environments are expected to employ a “fast” reproductive strategy characterised by early and frequent production of offspring, but with relatively little investment in each child. In contrast, individuals who develop in more stable and secure environments are expected to adopt a relatively “slow” reproductive strategy characterised by delaying reproduction, focusing on long term relationships and investing heavily in a relatively small number of children.

Attachment styles, insofar as they represent an individual’s expectations about the social environment, and especially the stability of social relationships, have been demonstrated to be associated with various aspects of reproductive strategies (see Del Giudice, 2009, for a review). In particular, there is some support for the theory that individuals with highly anxious attachment styles may be more likely to pursue a fast reproductive strategy since they perceive that they cannot rely on forming stable long term relationships in an unpredictable social environment (Del Giudice, 2009). In relation to the current work, life history theory may provide a link between self-esteem and reproductive behaviour, which is important in establishing whether or not self-esteem performs an evolutionarily adaptive function. As discussed above, for any trait to evolve, it must have an effect on individuals’ reproductive fitness. Since self-esteem has been shown to relate to anxious attachment (Foster et al. 2007), and this in turn has been associated with reproductive strategies (Del Giudice, 2009) it may be the case that self-esteem plays a part in guiding adaptive sexual behaviour. Preliminary evidence for this view comes from a recent study

by Gladden, Figuerdo and Snyder (2010) who found that a composite measure of fast reproductive strategies was negatively correlated with a composite measure of positive self-evaluations (which included a standard self-esteem scale). This suggests that individuals with low self-esteem, who perceive their relational value to be lower, and so may be less certain that they will be able to attain lasting and secure mating relationships, may be more inclined to pursue short term mating strategies. This is consistent with a sociometer model whereby self-esteem serves to adaptively regulate interpersonal relationships and its functioning has consequences for individual reproductive fitness. It may be the case that early attachment experiences causally influence self-esteem, which then guides reproductive decision making. At present, studies examining the link between self-esteem and sexual behaviour provide mixed results, and there is no consistent data supporting the hypothesis that low self-esteem might predict a fast reproductive strategy (Baumeister et al, 2003). However, including measures of self-esteem, attachment styles and sexual behaviour in future studies would be beneficial in further examining the suggestion of sociometer theory that self-esteem represents an evolutionary adaptation. For example, relationships between measures of *sociosexual orientation* (SOI: Simpson & Gangestad, 1991) which assess individuals' willingness to engage in short term sexual relationships characterised by low levels of emotional commitment could be administered along with self-esteem and attachment style instruments. Negative correlations between attachment anxiety, self-esteem and sociosexuality would support the present hypothesis that early childhood experiences influence both self-esteem and later sexual behaviour. However, such causal hypotheses could only be truly assessed using longitudinal studies designed to track social and sexual development throughout the lifespan.

7.6 Implications and Applications of the Current Work

One of the key motivations for attempting to gain a deeper understanding of the nature and functioning of self-esteem relates to the potential policy implications of various theories in this area. As previously discussed, there have been entire movements in the social sciences which have assumed that low self-esteem is responsible for a variety of social ills, and that employing interventions designed to improve self-esteem would help to solve these social problems (Mecca et al. 1989). These approaches assume that self-esteem exerts a top-down causal influence on both specific self-perceptions and behaviour. In contrast, bottom-up approaches to self-esteem, such as sociometer theory, would suggest that since self-esteem is not of key causal importance in itself it may be very difficult or even counter-productive to attempt to directly intervene to raise individuals' feelings of self-worth. There seem to be two key issues surrounding this debate. First, there is the question of whether it is possible to devise interventions to generally improve the self-esteem of large numbers of individuals. Second, there is the question of whether this would be desirable.

Study 4 demonstrated that it is possible to manipulate individuals' self-esteem, at least temporarily, and that this may have an effect on their specific self-evaluations. This is consistent with a wealth of evidence suggesting that it is possible to increase individuals' self-reported feelings of self-esteem using long term interventions (Baumeister et al. 2003). It should be noted, however, that given that these studies rely on explicit self-reports of self-esteem, any positive results should be treated with extreme caution. It seems likely that individuals who have taken part in programs designed to improve their self-

esteem may well be biased towards reporting a subsequent increase in self-esteem which may not reflect a genuine change in their sense of self-worth. It is suggested that future studies employ implicit pre and post intervention measures of self-esteem in order to address this issue. There is a further limitation of currently available research on self-esteem interventions. Unfortunately most of these interventions are designed to ultimately improve performance in other areas (e.g. academic performance) in addition to global self-esteem and so they typically involve also manipulating confidence and expectations in these specific areas. This makes it impossible to assess whether any effects of the intervention are purely the result of increasing global self-esteem. Future studies using more circumspect manipulations are required to assess whether improving specific self-evaluations (a bottom-up approach) or directly addressing overall feelings of self-worth (a top-down approach) represents the most effective way of increasing self-esteem. It may even be possible to utilise implicit manipulations of self-esteem, such as that employed in Study 4, to increase individuals' long term trait self-esteem. Whilst single administrations of this manipulation are likely to have only short term effects, it may be possible to employ it repeatedly over a longer period of time to induce more lasting improvements in trait self-esteem.

Sociometer theory has unique implications for the possibility of employing interventions which would improve the self-esteem of large groups of individuals. Whilst it may be possible to increase the self-esteem of individuals who perceive themselves to be socially excluded, either by helping them to improve their actual interpersonal relationships or their perceptions of these, it may be much more difficult to increase evaluations of desirability or relational value in large numbers of individuals (Brase & Guy, 2004). This is due to the

fact that relational value is an inherently relative construct; being desirable as a relational partner entails that one is superior to others in terms of relevant traits. Thus relational desirability is a *zero-sum* construct; increasing the relative status of some individuals necessarily entails decreasing the status of others. This analysis has interesting implications for the current modification of sociometer theory, which suggests that individuals with low levels of self-esteem may be most concerned with behaving cooperatively to attempt to maintain and enhance their level of social inclusion, whilst those with high self-esteem may be more concerned with competing for social status. It may be possible to improve a sense of social inclusion and acceptance and thus self-worth in individuals with low self-esteem, but not in those with higher self-esteem, who already feel secure in their relationships. However, doing this might lead to individuals with previously low levels of self-esteem engaging in more socially competitive behaviours. This relates to the issue of whether, even if possible, self-esteem interventions would be desirable.

As previously discussed, advocates of the self-esteem movement argue that increasing self-esteem is highly desirable since this will have positive effects on behaviour (Mecca et al. 1989). However, given that currently available evidence indicates no consistent causal relationships between high self-esteem and positive behaviour, this may be misguided (Baumeister et al. 2003). In fact some evidence suggests that high self-esteem, especially where this is not based on objective traits or abilities, may be associated with increased aggression (Bushman et al. 2009). In addition, the evidence reviewed in section 7.3 suggests that high self-esteem may also be associated with other competitive and negative interpersonal behaviours. This suggests that it may in

fact be quite socially detrimental to attempt to increase self-esteem in large numbers of individuals.

Although self-esteem has not been consistently found to predict behaviour, it is clearly positively associated with positive affectivity (Baumeister et al, 2003). Thus, it may be desirable to increase self-esteem in individuals simply to increase their levels of life-satisfaction or happiness. Again, sociometer theory offers a unique perspective on this debate. Sociometer theory suggests that in the majority of individuals, self-esteem accurately monitors levels of social inclusion and relational value and produces an affective response which motivates adaptive social behaviour (Leary & Baumeister, 2000). Therefore attempting to manipulate self-esteem may be detrimental in that it might lead to socially dysfunctional behaviour. For example, consider individuals who have correctly assessed that they have few or poor quality social relationships, and have resulting low self-esteem. Attempting to directly improve the self-esteem of these individuals may actually be counter-productive. Although this might result in positive affective responses it might also serve to de-motivate relationally enhancing behaviours or even lead them to adopt dysfunctional competitive interpersonal behaviours. Both of these could be damaging to their social relationships. It might be more profitable to help such individuals to attempt to improve the quantity and quality of their interpersonal relationships, and this should lead to an indirect improvement in their feelings of self-worth. In short, because sociometer theory considers the affective consequences of self-esteem to be functional in motivating adaptive social behaviour, it would seem to be undesirable to attempt to directly increase self-esteem in large numbers of individuals.

However, as Leary (2004) points out, some individuals may have *miscalibrated* sociometer systems. For example, some individuals may have low self-esteem despite the fact that they currently have numerous high quality social relationships, perhaps because they cannot accurately assess their level of social inclusion, or as a result of early negative attachment experiences (see Section 7.5). Direct interventions designed to improve self-esteem may be beneficial in alleviating the negative affective consequences of low self-esteem in such individuals. However, in order to maintain the link between feelings of social inclusion and self-esteem, it may be most effective to help these individuals to perceive the value of their relationships. In contrast, some individuals (for example, those with high levels of narcissism) may have miscalibrated sociometers which result in them having excessively high self-esteem which does not accurately reflect their levels of social inclusion and relational desirability. These individuals may display dysfunctional and potentially hostile social behaviours which are actually detrimental to their social relationships (see Leary, 2004). Perhaps counter-intuitively, such individuals may in fact benefit from interventions designed to decrease their inflated sense of self-worth, and which attempt to restore the link between objective social value and self-esteem. This analysis suggests that the decision about whether or not to employ self-esteem interventions should be tailored towards specific individuals, and cautions against using general strategies designed to increase self-esteem in all individuals.

In summary, it is currently unclear whether direct self-esteem interventions are possible or desirable. The current research, by attempting to examine causal relationships between self-evaluations and self-esteem, and the possible effects of the latter variable on interpersonal behaviour, is exemplary of the

kinds of studies which need to be conducted in future. The results of such studies will help to form a more accurate and complete understanding of self-esteem, which will be invaluable in aiding both clinical and public policy decisions concerning the use of self-esteem interventions.

7.7 Conclusions

Sociometer theory represents an important attempt to expand the understanding of self-esteem by focusing on its functional and adaptive significance. By emphasising the social nature of self-esteem, the theory may offer a greater understanding of its causes and consequences. However, although there is a considerable amount of evidence which is consistent with sociometer theory, most of it does not differentially support this theory in preference to competing accounts of self-esteem. In general, much of the research conducted in this area has been largely atheoretical and has tended to make assumptions about, rather than testing, the essential nature of self-esteem. The present work represents an attempt to begin to test specific hypotheses based on sociometer theory. The results of these studies provide some support for sociometer theory by indicating that feelings of self-esteem are positively related to self-assessments of physical attractiveness and mate value, particularly in women. However, no evidence that these self-assessments causally affect self-esteem was obtained, and instead, the data suggests the opposite causal relationship may sometimes operate. Additionally, specific self-assessments appear to be more important determinants of relational behaviour than is global self-esteem.

These results, together with previous research, suggest that initial formulations of sociometer theory may have been somewhat simplistic by focusing largely on relatively short term issues surrounding social inclusion. It is instead suggested that self-esteem may also serve to regulate more competitive aspects of social relationships, and that the relationships between self-evaluations, self-esteem and social behaviour may be complex, reciprocal, and ultimately rooted in an individuals' history of interpersonal interactions. Future research must confront the considerable challenge of untangling these complex relationships, and it is suggested that implicit measures and manipulations of self-esteem, natural experiments and longitudinal studies all offer important advantages over more widespread correlational studies in this regard. This research will not be easy, but it is of vital importance in developing a deeper understanding of the nature and function of self-esteem, which may have far-reaching consequences for both social policy making and individual happiness.

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